IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

SYCAMORE IP HOLDINGS LLC, *Plaintiff*, v. AT&T CORP., et al., *Defendants*.	§ § § § § § § § §	Case No. 2:16-CV-588-WCB LEAD CASE

MEMORANDUM OPINION AND ORDER

In these consolidated infringement actions, Plaintiff Sycamore IP Holdings LLC ("Sycamore") filed suit against a number of defendants grouped into four cases: Case No. 2:16-cv-588, against AT&T Corp., AT&T Services, Inc., and Teleport Communications America, LLC (collectively, "AT&T"); Case No. 2:16-cv-589, against CenturyLink Communications, LLC, and Qwest Corporation (collectively, "CenturyLink"); Case No. 2:16-cv-590, against Level 3 Communications, LLC ("Level 3"); and Case No. 2:16-cv-591, against Verizon Business Global, LLC, and Verizon Services Corporation (collectively, "Verizon"). On February 15, 2018, the Court was informed that the parties in the Verizon case have entered into a settlement agreement. Accordingly, this order will not address any issues relating to that case. The Court has set trial in the action against Level 3 to begin on April 23, 2018, with the trials in each of the other two cases to follow.

This order addresses a number of motions filed in advance of the Level 3 trial, some of which are filed by, or directed at, Level 3 alone, and some of which are filed by, or directed at, Level 3 and other defendants. This order will first address Sycamore's Motion for Partial

Summary Judgment of Infringement by Performing the Accused Mappings Pursuant to the Accused Standards, Dkt. No. 185; Defendants' Motion for Summary Judgment of Noninfringement, No Direct Infringement, and No Willful Infringement, Dkt. No. 193; and Sycamore's Motion for Summary Judgment on the Scope of Level 3's Infringement, Dkt. No. 191. After construing the relevant claim terms, with the assistance of supplemental briefs, see Dkt. Nos. 418, 419, 420, 421, 512, and 514, and oral arguments by the parties at the motions hearing held on January 19, 2018, the Court DENIES Sycamore's motion for partial summary judgment of infringement (Dkt. No. 185), GRANTS the defendants' motion for summary judgment of non-infringement (Dkt. No. 193), and DENIES AS MOOT Sycamore's motion for summary judgment on the scope of Level 3's infringement (Dkt. No. 191).

This order also addresses four motions for summary judgment relating to defenses raised by Level 3 and other defendants: Defendants' Motion for Summary Judgment of Invalidity Under 35 U.S.C. § 102(f) and 35 U.S.C. § 102(a), Dkt. No. 179; Defendants' Motion for Summary Judgment of Invalidity Under 35 U.S.C. Section 101, Dkt. No. 180; Sycamore's Motion for Summary Judgment of No Inequitable Conduct, Dkt. No. 186; and Sycamore's Motion for Summary Judgment on Equitable Estoppel, Fraud, Patent Misuse, Laches, Unclean Hands, and Waiver, Dkt. No. 183. The Court DENIED the first three of those motions following argument at the motions hearing, with an explanation for the Court's ruling on each motion. The Court GRANTED the fourth motion in part and DENIED it in part. In this order, the Court will expand on the explanations given in open court for its rulings on each of those four motions. The reasons for the Court's rulings in each instance incorporate both the Court's remarks during the motions hearing and the written elaboration on those remarks set forth below.

BACKGROUND

Sycamore alleges that the defendants have infringed claims 1 and 3–8 of U.S. Patent No. 6,952,405 ("the '405 Patent").[1] The patent is directed to a problem that arises during the electronic communication of information over networks when different communication protocols are used for different portions of the communication path. Transmission protocols that are frequently used in local area networks ("LANs"), such as Gigabit Ethernet ("GbE") or Fibre Channel, are inefficient for transmitting data over long-haul communication networks that are designed to carry data at high speeds and over long distances. Long-haul networks, sometimes referred to as wide area networks ("WANs"), therefore typically use different transmission protocols from those used in local networks; for example, long-haul networks often rely on optical communication protocols such as Synchronous Optical Networking ("SONET"). When multiple protocols are used, it is often desirable that messages transferred from a LAN system to a WAN system be transferred without the loss or corruption of information, a process known as "transparent transcoding."

A. The '405 Patent

A problem that engineers in the industry encountered during their efforts to devise transparent transcoding schemes was that differences in the bandwidth used by the LAN and WAN systems resulted in the inefficient use of the available WAN bandwidth. '405 patent, col. 1, line 52, through col. 2, line 11. The objective of the '405 patent was to create a transcoding protocol that would, for example, compress a GbE signal into fewer bits, thus enabling two GbE signals to be sent at once over a SONET link. Id., col. 2, ll. 53–59. To achieve that objective, the inventors of the '405 patent devised a transcoding system in which, for example, an 80-bit

[1] Claims 1 and 8 are independent claims. Claims 3 through 7 depend from claim 1.

information group from the GbE transmission is converted into a 65-bit information stream for transmission over the SONET link without the loss of any information. Id., col. 7, ll. 41–48; see also id., Fig. 6. The 65-bit stream includes not only data, but also bits that indicate the locations and identities of any control characters that were contained in the information group. Id., col. 2, ll. 41–52; see also id., col. 3, ll. 37–45.

The '405 patent refers to the input for the claimed encoding methods as an "information group." An "information group" is a series of bits comprising data words, control characters, or a combination of both data words and control characters. Dkt. No. 104, at 2. The output of the encoding methods is called the "encoded information stream." The parties agree that each "information group" is encoded into a single "encoded information stream," and that the two correspond one-to-one. See Dkt. No. 419, at 1 (Defendants: "'Encoded information stream' refers only to the data corresponding to a single incoming 'information group.'"); Dkt. No. 420, at 1 (Sycamore: "The parties agree that each 'encoded information stream' corresponds to a single 'information group' and vice versa.").

Claim 1 recites a method in which the encoding occurs through one of two processes, depending on whether the information group includes control characters. Claim limitation 1(a). If the information group contains only data words and no control characters, the first process is used. The first step is to generate a "data indicator." Claim limitation 1(b). The data indicator consists of one or more bits indicating whether the information group includes any control characters. Dkt. No. 104. The data indicator is combined with the data words, and both are included in the encoded information stream. The parties agree that the data indicator and the data words must be combined as part of the same encoded information stream. Dkt. No. 419, at 10 (Defendants: "The limitations require that the recited claim components [i.e., the data

indicator and data words] . . . be combined/included in one encoded information stream."); Dkt. No. 420, at 1 n.1 (Sycamore: "Sycamore agrees the referenced fields are contained within the same 'encoded information stream.'").

If the information group contains one or more control characters, the encoding method uses the second process, which consists of four steps. First, the control characters are encoded to form "control codes." Claim limitation 1(c)(i). Second, a transition indicator is generated based on the number of control codes that are present in the information group. Claim limitation 1(c)(ii). A "transition indicator," which consists of one or more bits, indicates the occurrence of the last control code in the encoded information stream. Dkt. No. 110. Third, a location pointer is generated for each control code; the location pointer indicates the sequential position of the corresponding control character within the information group. Claim limitation 1(c)(iii). Finally, the control codes, data words, location pointers, and transition indicator are all combined to form the encoded information stream. Claim limitation 1(c)(iv).

Claim 8, the only other independent claim asserted in this action, teaches a nearly identical method for encoding a multi-word information group. If the information group does not include control characters, the data words and a data indicator are encoded into an encoded information stream. Claim limitation 8(a). If the information group includes control characters, then: (i) the control characters are encoded into control codes; (ii) a transition indicator is generated; (iii) a location pointer is generated; and (iv) the control codes, the transition indicator, the location pointers, and any data words are combined into an encoded information stream. Claim limitation 8(b).

B. The Accused Mapping Standards

Sycamore accuses the defendants' networks of infringing the '405 patent to the extent that they use one of four transcoding methods, or "mappings," for which the Telecommunication

Standardization Sector of the International Telecommunications Union ("ITU-T") has issued standards. Sycamore's theory of infringement is that those standardized transcoding methods are covered by the claims of the '405 patent and that the defendants' use of those standardized methods in their communication systems infringes the patent. For ease of reference, the Court adopts the defendants' nomenclature of referring to the four accused mappings as Mappings A through D. See Dkt. No. 193.

Mapping A: In 2005, the ITU-T released a standard for what it called the Transparent Generic Framing Procedure ("GFP-T") in a document entitled ITU-T Recommendation G.7041/Y.1303. That standard, referred to as ITU G.7041, described a process for mapping LAN signals, such as Gigabit Ethernet or Fibre Channel signals, onto a transport network. Dkt. No. 185-2.

Mapping B: In 2009, the ITU-T released a standard for mapping Gigabit Ethernet signals onto networks that use an ODU0 signal (an optical data transport protocol). The document containing that standard is entitled ITU-T Recommendation G.709/Y.1331, and the standard is referred to as ITU G.709 or the G.709 standard. Dkt. No. 185-3. The 2009 version states: "The mapping of the 1000BASE-X signal into GFP-T is performed as specified in [ITU G.7041] . . . ." Id. at 84 (brackets in original).

Mapping C: In 2012, the ITU-T released a new revision to ITU G.709 that, among other things, set out a standard for mapping 10 Gigabit Ethernet Fibre Channel signals onto networks that use an ODU2 signal (another optical data transport protocol). Dkt. No. 185-4.

Mapping D: The 2012 version of ITU G.709 also described a standard for mapping 40 Gigabit Ethernet signals onto ODU3 (another optical data transport protocol). Id.

DISCUSSION

I. Claim Construction

Following summary judgment briefing, the Court identified several infringement disputes that the Court considered to be predicated on disagreements regarding claim construction. The Court therefore directed the parties to file briefs on the newly identified claim construction issues. Dkt. No. 389. The parties filed briefs addressing those issues, Dkt. Nos. 418–421, and the Court heard oral argument on those issues at the January 19, 2018, motions hearing. The Court will address two of those issues here: the meaning of the term "encoded information stream," and the meaning of the term "control characters" in the phrases "encoding the control characters," claim limitation 1(c)(1), and "encoding control characters," claim limitation 8(b). The Court does not address the "data words" claim construction issue raised only by CenturyLink. See Dkt. No. 419, at 20–23.

A. "Encoded Information Stream"

With respect to the term "encoded information stream," the parties disagree about two interrelated issues: (1) whether an encoded information stream must be a continuous series of bits, such that when a data indicator is "combin[ed]" with the data words the data indicator bits and the data words are physically contiguous; and (2) whether the bits in an encoded information stream may be logically connected but physically separate in the outgoing data signal, such that the data indicator bits may be separated from the data words by bits from other, unrelated encoded information streams.

Sycamore argues (1) that the '405 patent requires only that there be a "logical relationship" between the bits in an encoded information stream, and (2) that the word "combining" does not require physical contiguity. Sycamore notes that the specification permits the user to "arrange the fields . . . as desired," so long as the fields are sent in "prearranged

sequential locations in the encoded information stream." '405 patent, col. 6, ll. 12–19. Sycamore also emphasizes a sentence in the specification that reads: "It is not necessary to have these fields [i.e., the control codes, the data words, and the transition indicator] be physically contiguous within the encoded information stream as long as the fields can be found according to predetermined logic." Id., col. 6, ll. 20–22; see also id., col. 4, ll. 56–60 ("It is understood that the data indicator field . . . and the data fields . . . may be arranged in many other predetermined orders within the encoded information stream."); id., col. 5, ll. 65–67 ("Again it should be appreciated that the first and second fields 414 and 418 and the sub-fields 418_z may be arranged in other predetermined orders."); id., col. 8, ll. 18–21 ("These fields can be arranged in any of a variety of different orders, as desired by the user, within the constraints as described above."). From these descriptions in the specification, Sycamore concludes that the bits of an encoded information stream need not be contiguous in the outgoing signal.

Sycamore's position, however, begs the question. The quoted excerpts from the specification make clear that the various fields may be rearranged within the encoded information stream in any predetermined order, so long as those fields all appear within the same encoded information stream. Thus, it does not matter whether the control codes are transmitted first or last, or whether a control code is physically contiguous to its corresponding location pointer, so long as their positioning within the encoded information stream is predetermined. That much is beyond dispute. But that does not answer the question whether the encoded information stream itself consists of a continuous series of bits. That is, the specification does not unambiguously answer the question whether all of the bits belonging to a particular encoded information stream need to be physically contiguous, or whether the bits belonging to each

encoded information stream can be intermingled with bits belonging to other information streams.

While the specification is not explicit as to that issue, both intrinsic and extrinsic evidence supports the construction that an encoded information stream consists of a continuous series of bits. Both of the examples of encoded information streams depicted in the specification, Figures 3(a) and 3(b), depict a single block of contiguous bits. Figure 6, which "illustrates one example of the configurations for the encoded information stream 400 that may be generated according to the present encoding algorithm," '405 patent, col. 7, ll. 43–46, labels the bits in a 64B/65B encoded information stream sequentially, from bit 1 to bit 65.[2] See also id., col. 7, line 41, through col. 8, line 21 (describing a preferred embodiment of the encoding method in a sequential, bit-by-bit process).

Although the defendants concede that the specification does not expressly define the term "encoded information stream" to be limited to a continuous series of bits, they argue persuasively that a person of ordinary skill in the art would understand the term "stream" to impose a requirement of contiguity. For example, although dictionary definitions of the term "stream," including those cited by the defendants, are not identical, nor all equally relevant, they are consistent in suggesting that the term "stream," as of the date of the '405 patent application, was understood to refer to a continuous or sequential series of bits. See, e.g., Alan Freedman, The Computer Desktop Encyclopedia (2d. ed. 1999) (Stream: "A contiguous group of data." Streaming data: "Data that is structured and processed in a continuous flow, such as digital

[2] The notation "64B/65B" indicates that 64 bits of information payload are transmitted together with an additional bit that serves a different function in the group. The notation "8B/10B encoding" indicates that eight bits of information payload are transmitted in a 10-bit block. In general, the additional bits are added to preserve data integrity, to signal some characteristic about the payload bits, or for other technical reasons.

audio and video."); IEEE Standard Dictionary of Electrical and Electronics Terms (6th ed. 1997) (Stream: "An ordered sequence of characters, as described by the C Standard."); McGraw-Hill Dictionary of Scientific and Technical Terms (Sybil P. Parker, ed., 5th ed. 1994) (Stream: "A collection of binary digits that are transmitted in a continuous sequence, and from which extraneous data such as control information or parity bits are excluded."); Microsoft Computer Dictionary (5th ed. 2002) (Stream: "Any data transmissions, such as the movement of a file between disk and memory, that occurs in a continuous flow."); Official Internet Dictionary (Russ Bahorsky, ed. 1998) (Streaming: "A technique for transferring data in a continuous stream to allow large multimedia files to be viewed before the entire file has been downloaded to a client's computer."); U.S. Dep't of Commerce, Nat'l Tech. Info. Serv., Telecommunications: Glossary of Telecommunication Terms (1991) (Bit stream transmission: "The transmission of characters at fixed time intervals without stop and start elements. Note: The bits that make up the characters follow each other in sequence without interruption." Data stream: "A sequence of digitally encoded signals used to represent information for transmission."); Webster's New World Dictionary of Computer Terms (6th ed. 1997) (Stream: "A continuous flow of data through a channel."); Martin H. Weik, Communications Standard Dictionary (2d ed. 1989) (Bit stream: "An uninterrupted sequence of pulses representing binary digits transmitted in a transmission medium. For example, a continuous sequence of bits in a wireline or optical fiber." Data stream: "A sequence of characters or pulses used to represent information during transmission.").

Although the Court does not adopt any single one of those definitions as the sole proper construction of the term "encoded information stream," as that term is used in the '405 patent, the dictionary definitions as a whole indicate that a person of skill in the art at the time of the

invention would have understood that the word "stream" indicates contiguity, continuousness, or sequential ordering. Indeed, even Sycamore's expert, Dr. Scott Nettles, appears to have agreed with the thrust of those definitions when he testified in his deposition that "stream is a term of art and streams are sequences of things of indefinite extent." Dkt. No. 421-1, at 74:6–8.

Sycamore argues that a person of ordinary skill in the art would understand that the encoded information stream could be "further encoded, encrypted, or scrambled prior to transmission over the network." Dkt. No. 420, at 4. For example, Dr. Nettles explained that a person of ordinary skill in the art would know that the outgoing signal would be multiplexed for transmission and de-multiplexed at the receiver. Dkt. No. 418-3 ¶¶ 22–23. That may be so. But the patent does not address whether the stream might be further encoded, encrypted, scrambled, or multiplexed once it is sent to the network; it merely requires that the outgoing signal be encoded into a stream <u>before</u> it is sent to the network. <u>See</u> '405 patent, col. 4, ll. 38–41 (describing that, when no control characters are present, the indicator bit and data words are "sent to the serializer 280 which generates the encoded information stream to be sent to the network 290"); <u>id.</u>, col. 6, ll. 10–12 (describing that, when control characters are present, the data and control fields "are sent to the serializer 280 for generating the encoded information stream 400 to be sent to the network 290"); <u>id.</u>, col. 6, ll. 27–28 ("At the receiving end 300, a de-serializer 311 receives the encoded information stream 400 from the network 290."). That the stream may undergo additional encodings does not detract from the requirement that a stream be generated as part of the claimed methods.

This construction of the term "encoded information stream" is harmonious with the patent's use of the term "combine." The patent makes clear that certain fields are combined to generate the encoded information stream. <u>See, e.g.</u>, '405 patent, claim 1(b), col. 9, ll. 28–30

(“combining said data indicator with the data words of the information group to generate an encoded information stream”); id., claim 11, col. 11, ll. 16–17 (“generating an encoded information stream by combining said data indicator and the data words”); id., col. 2, ll. 33–36 (“[T]he control codes, the data words, the location pointers, and the transition indicator are combined for each information group to form the encoded information stream.”). Under Sycamore’s construction of “encoded information stream,” the term “combin[ed]” would mean merely “logically connected” in some manner. That interpretation of the term “combine” is not supported by the ’405 patent or any of the extrinsic evidence cited by Sycamore. If, however, “encoded information stream” means a contiguous set of bits such that the various fields are put together in a continuous stream, the term “combine” can assume its natural and ordinary meaning. See, e.g., Webster’s Third New Int’l Dictionary of the English Language (2002) (Combine: “[T]o bring into close relationship.”). The Court therefore construes “encoded information stream” to mean “a continuous series of encoded bits that is to be sent or received over the network and that corresponds to its respective information group.”

B. “Encoding Control Characters”

The defendants argue that two of the accused mappings, Mappings C and D, do not satisfy the limitations of claims 1 and 8 that provide for encoding control characters into control codes. The defendants’ argument raises two related claim construction issues: what it means to “encode,” and what types of information can be included in a “control character.”

As for the term “encode,” the parties agree that “encoding” control characters to control codes means that the control characters must be converted into a different form. Dkt. No. 418, at 11; Dkt. No. 419, at 18. The parties’ agreed-upon construction of “control codes” as “encoded control characters,” Dkt. No. 104, at 2, indicates that each control character must be encoded in some fashion. Furthermore, the specification provides that the encoding of the information

stream results in a reduction in "the necessary bandwidth for transporting the information," '405 patent, col. 2, ll. 36–37, and that "[t]he control codes have fewer bits than the control characters contained in the information group," id., col. 4, ll. 24–25. Therefore, it is clear that each control character must be converted in some way that results in a reduction in the number of bits. Accordingly, the Court construes "encoding control characters" to mean "converting at least a portion of each present control character into a form that comprises fewer bits."

Second, the parties dispute whether "control characters" consist exclusively of bits that represent system control information, or whether "control characters" can contain non-control information, including data information or block-type information. Although the parties previously agreed that "control characters" should be construed to mean "bits in an information group representing control information," Dkt. No. 104, at 2, Sycamore now argues for a construction that permits control characters to "include information relating to non-control information, so long as when considered in their entirety, they represent control information," Dkt. No. 418, at 9.

The defendants contend that the patent draws a clear distinction between "control characters" and "data," such that "control characters" must include only bits representing control information and may not include data. Dkt. No. 419, at 14–16. The defendants note that the asserted claims recite two distinct elements, "control characters" and "data words," and that the claims treat information groups that contain control characters differently from those that do not. Id. at 14–15. Based on that observation, the defendants conclude that "control characters and data words can't be the same thing." Id. at 15.

The Court agrees that the distinction between data information and control information is fundamental to the patent and its claimed encoding scheme. However, the defendants'

construction of "control characters" limits that term in a way that is not supported by the specification.

The '405 patent does not explicitly define the term "control character," except to say that the term is used "in place of the more conventionally used term control code." '405 patent, col. 3, ll. 39–40. As an example, the patent refers to the 1 Gigabit Ethernet standard in which there are 12 possible control codes. Id., col. 3, ll. 37–45; id., col. 6, ll. 61–62. The patent explains that the coding scheme it teaches is applicable to a variety of networking formats, including Gigabit Ethernet, Fibre Channel, and "other data formats that have been encoded using block line codes," id., col. 3, ll. 33–37; id., col. 4, ll. 53–57, such as "256B/257B, 128B/129B, 16B/17B, [and] 8B/9B," id., col. 2, ll. 66–67; see also id., col. 7, ll. 32–36. The patent is therefore not limited to a single encoding scheme or a single conception of control character, but states that it is applicable to a variety of "long-established Ethernet standard[s]." Id., col. 1, ll. 18–38.

The meaning of "control character" in the '405 patent is therefore not limited to the definition of control characters contained in the 1 Gigabit Ethernet standard that the patent describes as a preferred embodiment, nor is it limited to a series of bits that consist exclusively of system control information. The '405 patent designates certain bits as "control characters" based on the designation assigned by the LAN line encoding scheme. That is to say, the patented scheme relies on the input signal protocol to define the distinction between data words and control characters. The encoding protocol simply reduces the number of bits in each control character so as to transport the communication more efficiently over an optical network. As Sycamore's expert explained, in the 8B/10B encoding specification "there are clear definitions as to what the control and what the data is" and "the definition of 8b/10b says these are the control and these are the data." Dkt. No. 419-8, at 105:6–107:7; see also id. at 105:18–20 ("[W]hat is

control and what is data is something that you have to look at contextually."); id. at 106:1–2 ("This applies to other transcodings besides 8b/10b."). For purposes of the '405 patent, a control character can therefore contain whatever the incoming line encoding scheme provides in the portions of the signal that it designates as control characters, even if the control characters also include data information.

Finally, although the claims use the terms "data words" and "control characters," which could suggest that each field is limited to a single word or character, the specification makes clear that each field could also be a block, consisting of multiple words or characters. See '405 patent, col. 5, ll. 50–55 ("For example, if 5–8 blocks or words are included in the information group, a sub-field 418_z of 3-bits is preferably selected to represent the eight different positions where a control character may be found within the information group." (emphasis added)). The term "control character" can therefore refer to a block of multiple characters or words and is not limited to a single character. For the foregoing reasons, the Court construes "control characters" as "bits in an information group designated as related to control by the input encoding scheme."

II. Motions Relating to Infringement

A. Infringement: Accused Mappings A and B

1. The ITU G.7041 Standard (Mapping A)

Like the '405 patent, the G.7041 standard describes a method for encoding information. The G.7041 standard receives eight characters of 8B/10B information and maps them onto a 64B/65B block. Dkt. No. 185-2, at 30. In each 65-bit block, the "leading bit" or "flag bit" indicates whether "that block contains only 64B/65B 8-bit data characters or whether client control characters are also present in that block." Id. If the 65-bit block does not contain control characters, the flag bit is set as 0; otherwise it is set as 1. Id. If the 65-bit block contains control characters, the control characters are placed at the beginning of the block, and each control

character is encoded into eight bits. The first of those eight bits is a Last Control Character flag bit, which indicates whether that control character is the last control character in the block. The next three bits constitute the Control Code Locator, which indicates the original location of the control code character within the sequence of the eight characters contained in the block. The last four bits in the 8-bit group constitute the Control Code Indicator, which represents the 8B/10B control code character and is coded in 4 bits. Id. Figure 8-2 illustrates how the input is encoded:

Input client characters	**Flag bit**	**64-bit (8-Octet) field**							
All data	0	D1	D2	D3	D4	D5	D6	D7	D8
7 data, 1 control	1	0 aaa C1	D1	D2	D3	D4	D5	D6	D7
6 data, 2 control	1	1 aaa C1	0 bbb C2	D1	D2	D3	D4	D5	D6
5 data, 3 control	1	1 aaa C1	1 bbb C2	0 ccc C3	D1	D2	D3	D4	D5
4 data, 4 control	1	1 aaa C1	1 bbb C2	1 ccc C3	0 ddd C4	D1	D2	D3	D4
3 data, 5 control	1	1 aaa C1	1 bbb C2	1 ccc C3	1 ddd C4	0 eee C5	D1	D2	D3
2 data, 6 control	1	1 aaa C1	1 bbb C2	1 ccc C3	1 ddd C4	1 eee C5	0 fff C6	D1	D2
1 data, 7 control	1	1 aaa C1	1 bbb C2	1 ccc C3	1 ddd C4	1 eee C5	1 fff C6	0 ggg C7	D1
8 control	1	1 aaa C1	1 bbb C2	1 ccc C3	1 ddd C4	1 eee C5	1 fff C6	1 ggg C7	0 hhh C8

– Leading bit in a control octet (LCC) = 1 if there are more control octets and = 0 if this payload octet contains the last control octet in that block
– aaa = 3-bit representation of the 1st control code's original position (1st Control Code Locator)
– bbb = 3-bit representation of the 2nd control code's original position (2nd Control Code Locator)
...
– hhh = 3-bit representation of the 8th control code's original position (8th Control Code Locator)
– Ci = 4-bit representation of the ith control code (Control Code Indicator)
– Di = 8-bit representation of the ith data value in order of transmission

Figure 8-2/G.7041/Y.1303 – Transparent GFP 64B/65B code components (See Figure 8-3 for actual superblock structure)

The eight characters that compose the 64B/65B block are not transmitted over the network as a discrete block. Rather, eight 64B/65B code blocks are combined into a "superblock," which is described in Figure 8-3 of the standard. Dkt. No. 185-2, at 32. The entire

superblock is 536 bits in size and consists of the following components: First, the payloads from each of the eight 64B/65B blocks are grouped into a superblock—i.e., 64 characters of eight bits each; next, the "leading (Flag) bits of each of the eight 64B/65B codes are grouped together into a first trailing octet"; finally, 16 additional bits are sent, which are used "for a CRC-16 error check over the bits of this superblock." Id. The superblock has the following structure, in which each row is eight bits:

<table>
<tr><td colspan="8">Octet 1, 1</td></tr>
<tr><td colspan="8">Octet 1, 2</td></tr>
<tr><td colspan="8">Octet 1, 3</td></tr>
<tr><td colspan="8">.
.
.</td></tr>
<tr><td colspan="8">Octet 8, 7</td></tr>
<tr><td colspan="8">Octet 8, 8</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>L4</td><td>L5</td><td>L6</td><td>L7</td><td>L8</td></tr>
<tr><td>CRC-1</td><td>CRC-2</td><td>CRC-3</td><td>CRC-4</td><td>CRC-5</td><td>CRC-6</td><td>CRC-7</td><td>CRC-8</td></tr>
<tr><td>CRC-9</td><td>CRC-10</td><td>CRC-11</td><td>CRC-12</td><td>CRC-13</td><td>CRC-14</td><td>CRC-15</td><td>CRC-16</td></tr>
<tr><td colspan="8">where: Octet j, k is the kth octet of the jth 64B/65B code in the superblock
Lj is the leading (Flag) bit jth 64B/65B code in the superblock
CRC-i is the ith error control bit where CRC-1 is the MSB of the CRC</td></tr>
</table>

Figure 8-3/G.7041/Y.1303 – Superblock structure for mapping 64B/65B code components into the GFP frame

The G.7041 standard notes that "[t]o minimize latency, the transparent GFP mapper can begin transmitting data as soon as the first 64B/65B code in the group has been formed rather than waiting for the entire superblock to be formed." Id.

2. The 2009 Version of the ITU G.709 Standard (Mapping B)

As noted, in 2009 the ITU-T issued a standard for mapping Gigabit Ethernet signals onto certain types of optical transport networks. This standard was designated as ITU G.709, but it stated that the mapping "is performed as specified in [ITU G.7041]," that is, Mapping A. Dkt.

No. 185-5, at 84 (brackets in original). The infringement analysis is therefore identical for Mappings A and B.

3. Infringement of Claim Limitations 1(b) and 8(a)

Sycamore's theory of infringement is that the defendants practice the two mapping standards at issue in this case, ITU G.7041 and ITU G.709, and that any party that practices those mapping standards will necessarily infringe the asserted claims of the '405 patent. The defendants respond that a party that practices the G.7041 mapping standard does not necessarily infringe claim limitations 1(b) and 8(a) of the '405 patent, and that proof that the defendants practice those mapping standards therefore does not constitute proof of infringement.

Sycamore's infringement theory is based on the principles set out by the Federal Circuit in Fujitsu Ltd. v. Netgear Inc., 620 F.3d 1321 (Fed. Cir. 2010). There, the Circuit held that a district court "may rely on an industry standard in analyzing infringement." Id. at 1327. Specifically, the court held that "[i]f a district court construes the claims and finds that the reach of the claims includes any device that practices a standard, then this can be sufficient for a finding of infringement." Id. However, the court cautioned that "in many instances, an industry standard does not provide the level of specificity required to establish that practicing that standard would always result in infringement." Id. The court emphasized that in such cases the patent owner cannot establish infringement simply by "arguing that the product admittedly practices the standard, therefore it infringes." Id. at 1328. Rather, "the patent owner must compare the claims to the accused products or, if appropriate, prove that the accused products implement any relevant optional sections of the standard." Id. It is only in the situation in which a patent covers "every possible implementation of a standard" that it will be "enough to prove infringement by showing standard compliance." Id. Applying the test set forth in Fujitsu, this

Court agrees with the defendants that the evidence does not show that practicing the G.7041 standard would necessarily infringe the ’405 patent, and that the defendants are therefore entitled to summary judgment of non-infringement.

The parties do not disagree that the “information group” referred to in the G.7041 mapping standard consists of the eight incoming characters of the 8B/10B signal—that is, 80 bits of information that comprise some combination of eight data words and/or control characters. The “encoded information group” in the G.7041 standard is therefore the 64B/65B encoding of those eight data words and/or control characters, consisting of a single flag bit and eight bits for each of the eight data words or control characters. See Dkt. No. 159-1, at A-1 (Sycamore’s infringement contentions regarding the G.7041 standard, dated September 12, 2016, identify the “Input client characters” in Figure 8-2 as the multi-word information group for claim 1 and describe the information group as containing eight data words, eight control characters, or a mixture of eight data words and control characters); id. at A-20 (stating, for claim 3, “Each of the information groups comprises 8 words . . . . Each of the words of the information group comprises 10 bits (i.e., an 8B/10B character).”); id. at A-22 (stating, for claim 4, “Each of the information groups comprises 80 bits (8 10-bit 8B/10B characters).”); see also Dkt. No. 185, at 10; Dkt. No. 245, at 3; Dkt. No. 418, at 9 (“In the G.7041 GFP-T standard, a ‘block’ is defined as a 64b/65b portion of the outgoing signal that corresponds to 80 bits of an incoming 8b/10b signal (or 64 bits of an incoming 8-bit signal). If those 80 (or 64) bits are the ‘information group’, then each 64b/65b block is a single ‘encoded information stream.’” (citation omitted)).[3] The “data indicator” is the “flag bit” in the G.7041 standard. Dkt. No. 159-1, at A-6 through A-7.

[3] Sycamore is not asserting that the 536-bit superblock is the encoded information stream, such that the information group consists of 64 8B/10B characters. Because the G.7041 mapping standard processes data in groups of eight 8B/10B characters, the result of that interpretation

Under the Court's claim constructions, Sycamore has not presented evidence that the G.7041 mapping standard necessarily satisfies either claim limitation 1(b) or claim limitation 8(a) of the '405 patent. Claim limitation 1(b) requires that the data indicator and data words be combined to generate an encoded information stream that includes the data indicator and data words. Similarly, claim limitation 8(a) requires that the data words be encoded with a data indicator to generate an encoded information stream. The G.7041 standard does neither. Although the G.7041 standard generates a flag bit for each 64-bit information group, the data words and the corresponding flag bit are not combined, but are transmitted separately. The superblock structure transmits the data words and control characters first, followed by an octet of eight flag bits. Because the eight separate information groups—i.e., eight separate encoded information streams—are transmitted first, and the data indicators for all eight are combined and transmitted later, the data indicator is never put into a contiguous stream of encoded information with the data words. For that reason, the transmission of the superblocks under the G.7041 standard does not infringe the '405 patent.

In its opposition to the defendants' motion for summary judgment of non-infringement, Sycamore made an alternative argument in favor of infringement. It argued that superblock encoding is a two-part process, and that "the data indicator and data words are first combined before the data indicator is separated into a trailing octet." Dkt. No. 245, at 7. As support for that proposition, Sycamore cited two White Papers on the G.7041 and G.709 standards prepared by Dr. Steve Gorshe, an engineer with PMC-Sierra and one of the principal architects of the standards. See Dkt. Nos. 245-12 and 245-13. Summarizing the mapping method for Gigabit

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would be that the accused products would fail to satisfy various claim limitations of the '405 patent, including the limitations directed at generating a data indicator, a transition indicator, and a location pointer. See Dkt. No. 193, at 11–15.

Ethernet onto OPU0 in the 2011 White Paper, Dr. Gorshe described the implementation of the G.709 standard as follows:

"Adapt the incoming GE signal into GFP-T:

- Transcode the incoming GE 8B/10B characters into 64B/65B code blocks,
- Group eight 64B/65B blocks into a 67 byte superblock, and
- Map one superblock into a GFP frame, with no 65B_PAD or GFP Idles."

Dkt. No. 245-13, at 41. Sycamore also cites the 2005 White Paper by Dr. Gorshe, Dkt. No. 245-12, which addressed the G.7041 standard. The cited portions of that White Paper describe the GFP-T mapping protocol and the way data and control characters are mapped into a 64B/65B code. It describes the process of mapping an incoming information stream to form a 64B/65B code, after which eight 64B/65B codes are combined into a superblock in which the "payload data bytes of the eight constituent 64B/65B codes are placed into the superblock in transmission order, with the eight leading (flag) bits of these codes grouped together in a trailing byte." Id. at 15.

In their reply brief, the defendants did not respond to Sycamore's argument based on the White Papers. Because little attention had been devoted to the White Papers in the parties' briefs, the Court requested additional briefing on the relevance and admissibility of the White Papers. Dkt. No. 494. The defendants responded that the White Papers are inadmissible as hearsay and do not create a fact issue regarding infringement. Dkt. No. 512. Sycamore responded that the White Papers are admissible and that they raise a factual issue as to infringement. Dkt. No. 514. Sycamore also pointed to certain technical documents generated by manufacturers of the equipment that use the accused mappings. That evidence had not previously been submitted as part of the summary judgment record.

For purposes of the summary judgment motions, the Court will assume the White Papers are both admissible. The question before the Court on Sycamore's alternative theory of infringement is whether Sycamore's evidence, consisting primarily of the G.7041 standard and the two White Papers, is sufficient to create a factual issue as to whether the standards require the formation of an infringing block of continuous bits before the data indicator is separated from the data to which it pertains.

Sycamore argues that the G.7041 standard establishes that the decoded 8B/10B characters are mapped into a 64B/65B block, as shown in Figure 8-2 of the standard, before the 64B/65B blocks are grouped into a superblock, as shown in Figure 8-3 of the standard. Dkt. No. 185-2, at 30, 32. The block shown in Figure 8-2, Sycamore argues, is a physical, contiguous block of bits. That characterization, according to Sycamore, is consistent with the statement in the 2011 White Paper referring to "[t]ranscod[ing] the incoming GE 8B/10B characters into 64B/65B code blocks." Dkt. No. 509-2, at 41.

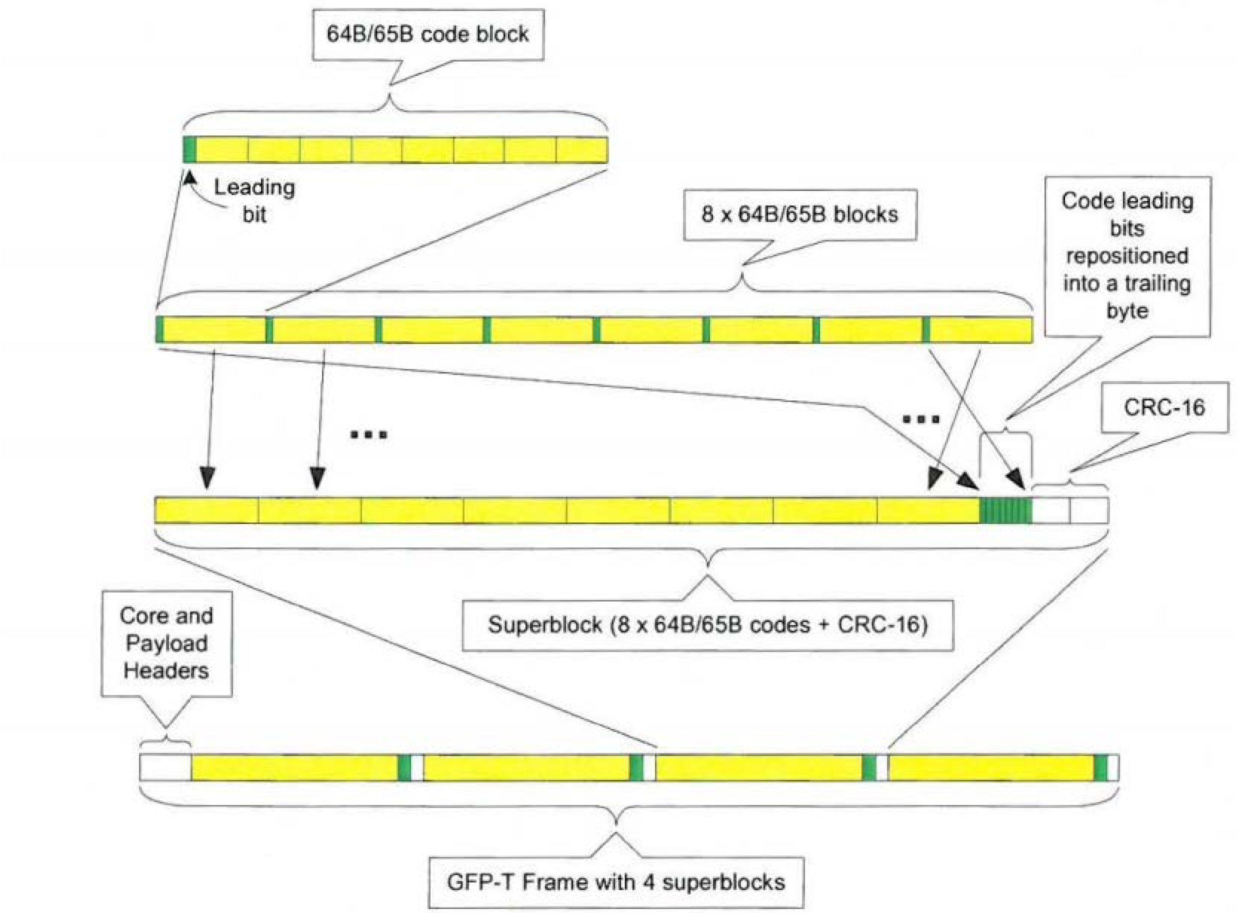
The problem with Sycamore's theory is that neither the G.7041 standard nor the White Papers establishes that the 64B/65B block consists of physically contiguous bits, as opposed to bits that are logically related but not necessarily continuous within the communication signal.[4] Both the standard and the White Papers refer to the 64B/65B blocks as "codes" or "code blocks," Dkt. No. 509-1, at 15–16; Dkt. No. 509-2, at 41, and the standard refers to the 64B/65B code being "formed," Dkt. No. 418-4, at 32, but none of those references states that the standard

[4] Ironically, Sycamore's alternative argument causes the parties to switch positions with respect to whether bits that are part of a stream or block must be contiguous or need only be logically related. Sycamore argued that logical relationship was enough in connection with the construction of the term "stream," but now argues that physical contiguity is required for the term "block." The defendants have taken the opposite position. The Court's analysis results in a different construction for the two terms, based on the evidence that the term "stream" has been interpreted as requiring continuous or contiguous bits, while there is no evidence that the term "block" must be given the same construction.

requires that a physical "block" of contiguous bits ever be generated in order to satisfy the '405 patent.

For example, the 2005 White Paper articulates, in granular detail, the "process of going from the 64B/65B code to a GFP frame," which is illustrated in Figure 6 of that document. Dkt. No. 245-12, at 16. Figure 6 shows the construction of the GFP-T frame in four steps: first, it shows a 65-bit block of contiguous bits containing the leading bit and the 64 bits of payload information; second it shows a 520-bit block consisting of eight 65-bit blocks, in which each leading bit is physically contiguous with its respective 64 bits of payload information; third, the eight leading bits are repositioned into a trailing byte to form the superblock structure; and finally, four superblocks are fit into a GFP-T frame.

Figure 6 Construction of the GFP-T frame



Dkt. No. 245-12, at 17. If this four-step process of encoding were necessary for implementing the G.7041 standard, the first and second steps would satisfy the contested claim limitations.

However, the standard itself suggests that this four-step process need not occur. The standard states that "[t]o minimize latency, the transparent GFP mapper can begin transmitting data as soon as the first 64B/65B code in the group has been formed rather than waiting for the entire superblock to be formed." Dkt. No. 185-2, at 32. Because information can begin to be transmitted immediately after the first block of information is received, the standard does not require the actual physical generation of the second step of the White Paper's four-step implementation. Given that the 2005 White Paper is intended to "provide an overview of GFP

for a reader who is unfamiliar with this technology," Dkt. No. 245-12, at 5, the Court cannot infer that the White Paper describes the only possible implementation of the G.7041 mapping standard. It is therefore insufficient to satisfy Sycamore's burden.

The defendants elicited expert testimony from several witnesses that the 64B/65B block referred to in the G.7041 standard does not have to consist of physically contiguous bits. See Dkt. No. 298-6, 91:22–92:10 (Sharma deposition: "Q. In order to create an output 64b/65b block, is it necessary that those 65 bits be physically contiguous? A. It's not necessary that they be physically contiguous, no."); Dkt. No. 185-10 ¶ 248 (Lanning Report: "Figure 8-2 is a logical representation. . . . Figure 8-2 does not depict how products practicing the accused standard must be implemented. Dr. Nettles has presented no evidence that the Accused Instrumentalities perform the encoding as depicted in Figure 8-2. Indeed, it would make no sense and be less efficient to generate such a structure and then encode the 64B/65B blocks into the superblock structure shown in Figure 8-3."); Dkt. No. 185-11 ¶ 124 (Schofield Report: "Dr. Nettles provides no source code, documentation, or analysis as to whether the intermediary step shown in Figure 8-2 is ever generated by any of the accused line cards. Based on my experience, doing so is unnecessary and could lead to added latency. Instead of generating the blocks shown in Figure 8-2 and then transforming those blocks into the superblock structure of Figure 8-3, one of skill in the art would generate the information stream of each octet as shown in Figure 8-3 and then separate the data indicator by placing it in the appropriate slot in the first trailing octet. Thus, from an implementation stand point, one of skill in the art could place the data indicator directly into the first trailing octet without ever combining it with the data words in the encoded information stream as required by limitation 1(b).").

Sycamore offered no expert evidence to the contrary. In fact, Sycamore's expert, Dr. Nettles, gave testimony that was squarely at odds with Sycamore's alternative theory of infringement. He admitted that Figure 8-2 from the G.7041 standard does not "depict what is actually generated and sent over a communications link," but instead "is showing the logical relationships that go into the transform. The figure which is 8-3, which is the superblock, is closer to what is sent over the wire[.]" Dkt. No. 427-4, at 152:14–21. When asked, "Is 8-2 generated?" Dr. Nettles replied, "Something that has all of the pieces of 8-2 is generated because otherwise there would be no way to recreate them." Id. at 155:5–8. He added, "[t]he output stream is generated with the logical relationships we see in 8-2 . . . you don't have to preserve the physical relationships we see in 8-2 in the serialized output." Id. at 159:4–23. He conceded that "I don't necessarily have visibility into what the implementation of the framer does and what order they do things in," id. at 160:3–6, but he clarified that "picture 8-2 tells us how to encode information groups. Figure 8-3 tells us more about how the serializer formats things," id. at 162:8–10. When asked, "So it doesn't matter for purposes of infringement whether what is actually physically generated takes the form of what is shown in Figure 8-2, it just needs to employ the logical relationships depicted in Figure 8-2; is that correct?" he answered, "It has to have the pieces." Id. at 166:15–21. Thus, Dr. Nettles conceded that, as the defendants' experts contended, the G.7041 standard does not require an implementation that generates the 65 bits of the 64B/65B block depicted in Figure 8-2 in a physically contiguous form. His testimony puts the kibosh on Sycamore's alternative infringement theory that the 64B/65B block of Figure 8-2 is generated before the creation of the superblock of Figure 8-3 and that each of the data-only blocks in the 64B/65B block is an encoded information stream of continuous bits that includes both the data indicator and data words.

In response to the Court's request for the parties to brief the issue of the admissibility and relevance of the White Papers, and to provide any deposition testimony or expert reports in the case that discussed the White Papers, Sycamore submitted specification sheets from four chip manufacturers. Sycamore contends that the chips made by those manufacturers generate an intermediate block of physically contiguous bits corresponding to one of the blocks displayed in Figure 8-2 of the G.7041 standard.

Those specification sheets, Dkt. Nos. 514-2 through 514-5, provide no significant support for Sycamore's infringement claims. To begin with, Sycamore's infringement contention was that the defendants practice the G.7041 standard and that practicing that standard would necessarily result in infringement of the '405 patent. See Fujitsu, 620 F.3d at 1327–28. Even assuming that the specification sheets describe an infringing 65-bit block of continuous bits, the specification sheets do not prove that the G.7041 standard must be implemented in a way that infringes Sycamore's patent, but only that it could be. Second, at least two of the specifications—those from Nortel Networks and Ciena Corporation—contain language that largely tracks the G.7041 standard. Nothing in those specifications provides support for Sycamore's alternative theory of infringement. The other two specifications—from Applied Micro Circuits Corp. and Cortina Systems, Inc.—are ambiguous; without supporting testimony explaining the language used in those specifications, it is not clear whether the reference to "blocks" and "codes" are meant to refer to physical structures or merely logical constructs. And finally, Sycamore represented that it was not relying on those specifications to prove infringement, but was merely using them as support for the proposition that the G.7041 standard is consistent with Sycamore's alternative theory of infringement.

In sum, the Court concludes that the evidence presented on summary judgment fails to show a genuine issue of material fact as to infringement by Accused Mappings A or B.

B. Infringement: Accused Mappings C and D[5]

1. The Standards

The 2012 revised version of the G.709 standard provided for mapping of faster LAN networks onto faster optical transport networks. Among other changes, the revised standard provided for mapping 10 Gigabit Fibre Channel signals onto ODU2e signals (Mapping C) and 40 Gigabit Ethernet signals onto ODU3 signals (Mapping D). The 2012 document was released as a new version of ITU-T Recommendation G.709/Y.1331. Except for one difference at the end of the encoding process, Mapping C and Mapping D are identical. Sycamore claims that both infringe the ’405 patent.

Mappings C and D are both methods to encode data and to send it more efficiently over a transport network. Rather than receive information in 8B/10B characters, as in the ’405 patent and the G.7041 standard, Mappings C and D process input that is in the form of 64B/66B code blocks—i.e., 64 bits of content and two bits of overhead. Dkt. No. 185-4, at 164–65. According to the line encoding scheme, each 64B/66B block can be one of two types: a data block, which contains eight data bytes; or a control block, which can include a mixture of data and control information. Id. at 164.

The 64B/66B control blocks are more complex than the control words in the 8B/10B scheme. In the 8B/10B scheme, there are only 12 possible control words. The 64B/66B line encoding scheme describes 15 different control block types, which can contain exclusively control information or a mixture of control and data information. Id. at 166, 168. Specifically, a

[5] Sycamore does not accuse Level 3 of infringing by practicing Mappings C or D; as to Level 3, only Mappings A and B are at issue.

64B/66B control block contains a two-bit sync header, eight bits to indicate which of the 15 block types the control character is, and 56 bits of other information. Id. Figure B.2 of the 2012 mapping standards illustrates the data block format and the 15 control block formats:

Input Data	SYNC		Block Payload								
Data Block Format (Bit Position)	0	1	2–65								
D0D1D2D3D4D5D6D7	0	1	D0	D1	D2	D3	D4	D5	D6	D7	
Control block formats			**Block type field**								**4-bit code**
C0C1C2C3C4C5C6C7	1	0	0x1e	C0	C1	C2	C3	C4	C5	C6	C7	0001
C0C1C2C3O4D5D6D7	1	0	0x2d	C0	C1	C2	C3	O4	D5	D6	D7	0010
C0C1C2C3S4D5D6D7	1	0	0x33	C0	C1	C2	C3		D5	D6	D7	0111
O0D1D2D3S4D5D6D7	1	0	0x66	D1	D2	D3	O0		D5	D6	D7	1011
O0D1D2D3O4D5D6D7	1	0	0x55	D1	D2	D3	O0	O4	D5	D6	D7	1101
S0D1D2D3D4D5D6D7	1	0	0x78	D1	D2	D3	D4	D5	D6	D7		1110
O0D1D2D3C4C5C6C7	1	0	0x4b	D1	D2	D3	O0	C4	C5	C6	C7	1000
T0C1C2C3C4C5C6C7	1	0	0x87		C1	C2	C3	C4	C5	C6	C7	0011
D0T1C2C3C4C5C6C7	1	0	0x99	D0		C2	C3	C4	C5	C6	C7	0101
D0D1T2C3C4C5C6C7	1	0	0xaa	D0	D1		C3	C4	C5	C6	C7	1001
D0D1D2T3C4C5C6C7	1	0	0xb4	D0	D1	D2		C4	C5	C6	C7	1010
D0D1D2D3T4C5C6C7	1	0	0xcc	D0	D1	D2	D3		C5	C6	C7	1100
D0D1D2D3D4T5C6C7	1	0	0xd2	D0	D1	D2	D3	D4		C6	C7	0110
D0D1D2D3D4D5T6C7	1	0	0xe1	D0	D1	D2	D3	D4	D5		C7	0000
D0D1D2D3D4D5D6T7	1	0	0xff	D0	D1	D2	D3	D4	D5	D6		1111

Figure B.2 – 66B Block coding

As in the G.7041 mapping standard, in which eight 8B/10B words are grouped and processed, Mappings C and D group and process eight 64B/66B blocks to encode a 512B/513B block. Id. at 165. The composition and structure of the 512B/513B block is determined based on the number of 64B/66B data blocks and control blocks to be included in the 512B/513B block. Id. at 168–69. If the 512B/513B structure contains at least one control block, a flag bit is set to "1"; if the structure contains only data blocks, the flag bit is set to "0." Id. Data blocks are transmitted without any further encoding. Figure B.5 shows the components of the 512B/513B structure,[6] based on the number of 64B/66B data blocks and control blocks:

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[6] The statements in the chart below that "-aaa = 4-bit representation of the first control code's type (first control block type: CB TYPE)"; "-bbb = 4-bit representation of the second control code's type (Second control block type: CB TYPE)"; and "-hhh = 4-bit representation of the eight control code's type (Eighth control block type: CB TYPE)" appear to be erroneous. The references to "-aaa"; "-bbb"; and "-hhh" should read "-aaaa"; "-bbbb"; and "-hhhh."

Input client characters	Flag bit	512-bit (64-Octet) field							
All data block	0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	DB8
7 data block 1 control block	1	0 AAA aaaa CB1	DB1	DB2	DB3	DB4	DB5	DB6	DB7
6 data block 2 control block	1	1 AAA aaaa CB1	0 BBB bbbb CB2	DB1	DB2	DB3	DB4	DB5	DB6
5 data block 3 control block	1	1 AAA aaaa CB1	1 BBB bbbb CB2	0 CCC cccc CB3	DB1	DB2	DB3	DB4	DB5
4 data block 4 control block	1	1 AAA aaaa CB1	1 BBB bbbb CB2	1 CCC cccc CB3	0 DDD dddd CB4	DB1	DB2	DB3	DB4
3 data block 5 control block	1	1 AAA aaaa CB1	1 BBB bbbb CB2	1 CCC cccc CB3	1 DDD dddd CB4	0 EEE eeee CB5	DB1	DB2	DB3
2 data block 6 control block	1	1 AAA aaaa CB1	1 BBB bbbb CB2	1 CCC cccc CB3	1 DDD dddd CB4	1 EEE eeee CB5	0 FFF ffff CB6	DB1	DB2
1 data block 7 control block	1	1 AAA aaaa CB1	1 BBB bbbb CB2	1 CCC cccc CB3	1 DDD dddd CB4	1 EEE eeee CB5	1 FFF ffff CB6	0 GGG gggg CB7	DB1
8 control block	1	1 AAA aaaa CB1	1 BBB bbbb CB2	1 CCC cccc CB3	1 DDD dddd CB4	1 EEE eeee CB5	1 FFF ffff CB6	1 GGG gggg CB7	0 HHH hhhh CB8

- Leading bit in a 66B control block FC = 1 if there are more than 66Bcontrol block and = 0 if this payload contains the last control block in that 513B block
- AAA = 3-bit representation of the first control code's original position (First control code loca tor: POS)
- BBB = 3-bit representation of the second control code's original position (Second control code lo cator: POS)
.....
- HHH = 3-bit representation of the eighth control code's original position (Eighth control code lo cator: POS)
- aaa = 4-bit representation of the first control code's type (first control block type: CB TYPE)
- bbb = 4-bit representation of the second control code's type (Second control block type: CB TYPE)
.....
-hhh = 4-bit representation of the eighth control code's type (Eighth control block type: CB TYPE)
- CBi = 56-bit representation of the i-th control code caracters
- DBi = 64-bit representation of the i-th data value in order of transmission

G.709-Y.1331(12)_FB.5

Figure B.5 – 513B code block components

Control blocks, which include eight bits of block type information and 56 bits of control and/or data information, are encoded as follows: The eight-bit control block type is "translated into a 4-bit code according to the rightmost column of Figure B.2." Id. at 168. This four-bit code is shown in Figure B.5 as four lowercase letters ("aaaa," "bbbb," etc.). A three-bit "POS field" is generated to indicate the position of the original 64B/66B control block in the sequence of the eight 64B/66B blocks that are received in the coding process. Id. The POS field is shown in Figure B.5 as three capital letters ("AAA," "BBB," etc.). A flag continuation bit ("FC") indicates whether the particular control block is the final control block in the 512B/513B

mapping group, or whether there are additional control blocks in the group. Id. Figure B.4 shows the structure of the eight-bit "control block header":

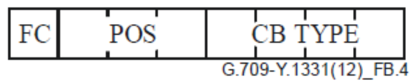

Figure B.4 – 513B block's control block header

The control block header is combined with the remaining 56 bits of the control block to create a 64-bit row in the 512B/513B structure. Id. Any control blocks are placed at the front of the 512B/513B structure, in the order in which they were received, followed by any data blocks, in the order received. Id. Figure B.3 depicts an example, containing five data blocks and three control blocks (the fifth, sixth, and seventh rows on the left side of the figure), of how eight incoming 64B/66B blocks are processed and rearranged into the 512B/513B structure:

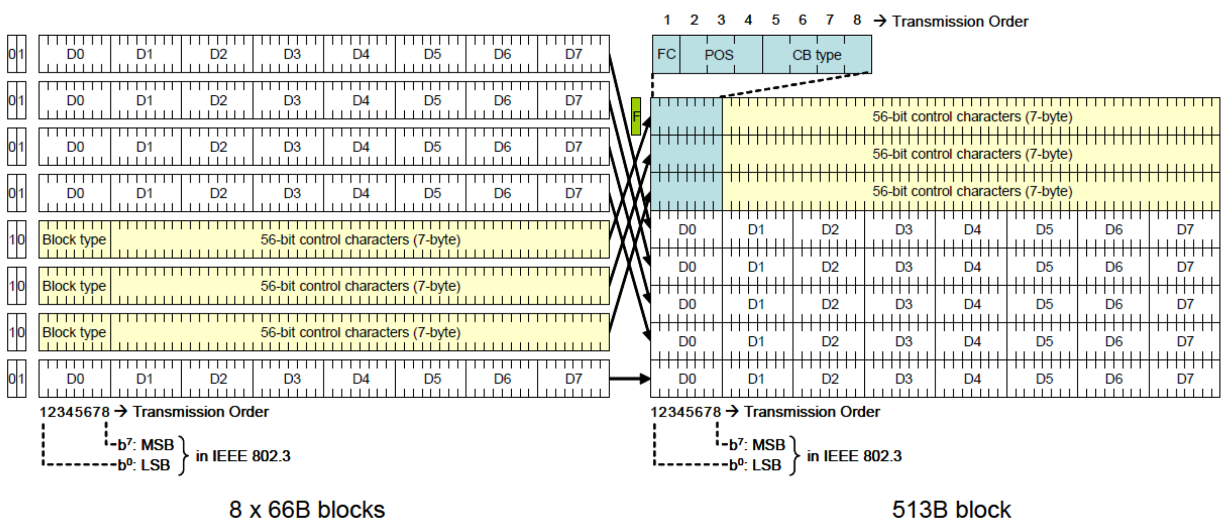

Figure B.3 – 513B block code format

The two mapping standards diverge at the final step. In Mapping C, each 512B/513B structure is grouped with seven other 512B/513B structures to form a "516-octet superblock," and 17 such superblocks are grouped to form an 8800-octet GFP frame. Id. at 95. As in the G.7041 mapping standard, the physical structure of the superblock is significant for infringement analysis. Figure 17-18 of the 2012 version of the G.709 standard, set out below, illustrates the

FC1200 GFP frame, with four bytes (32 bits) per row, and shows in detail the structure of a single superblock. The figure shows that a superblock has 512 bytes (4096 bits) of information and four trailing bytes (32 bits). Specifically, the eight one-bit flag bits are grouped together in a single octet at the end of the superblock (the "Superblock flags"), followed by 24 CRC error-check bits. Id. at 95–96.

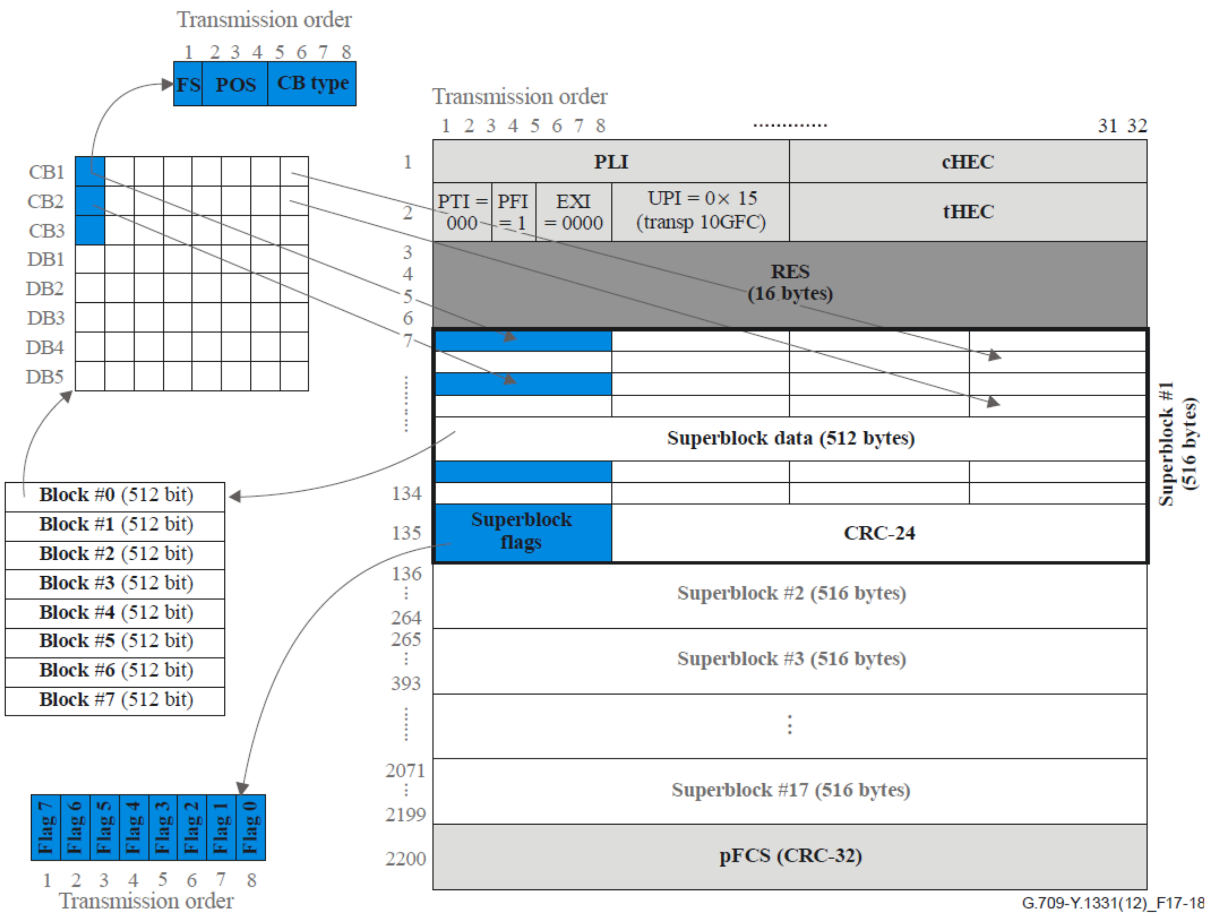

Figure 17-18 – GFP frame format for FC-1200

Mapping D combines the 512B/513B structures in a different way. Rather than being combined into a superblock, two 512B/513B structures are combined to form a 1027B block. Id. at 92. Mapping D adds an additional leading bit, the "flag parity bit" to protect the 512B/513B structure's flag bit and signal the location of the code blocks. Id. at 191. The two 512B/513B

structures are transmitted in the following order: the parity bit; the flag bit from the first 512B/513B structure; the flag bit from the second 512B/513B structure; the payload (i.e., the eight data and/or control blocks) from the first 512B/513B structure; and finally, the payload from the second 512B/513B structure. Id. Figure F.1 from the 2012 standard illustrates this structure:

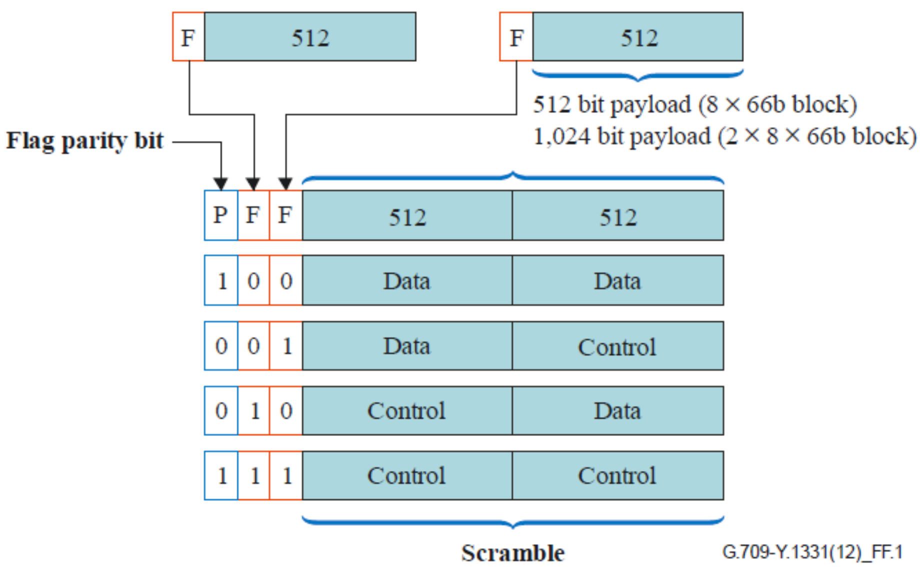

Figure F.1 – Flag parity bit on two 513B blocks (1027B code)

2. Infringement of Claim Limitations 1(b) and 8(a)

As with the first two accused mappings, Sycamore's theory of infringement is that the defendants practice Mappings C and D, and that those mapping standards necessarily infringe the asserted claims of the '405 patent. The defendants again respond that Sycamore's evidence fails to show that implementing the mapping standards necessarily satisfies limitations 1(b) and 8(a) of the '405 patent, and that Sycamore has therefore failed to prove that practicing the mapping standards constitutes proof of infringement. The Court again agrees with the defendants.

Sycamore contends that the "information group" in the 512B/513B mapping standards is the set of eight 64-bit blocks that are shown in Figure B.5. Dkt. No. 185, at 16; see also Dkt. No.

159-1, at C-1 (Sycamore's infringement contentions regarding Mapping C, dated September 12, 2016, which identify the "multi-word information group" as the eight 64-bit blocks shown in Figure B.5); id. at D-1 (same, regarding Mapping D). As in the case of the G.7041 mapping standard, the "data indicator" of the '405 patent corresponds to the standard's "Flag bit." Id. at C-8, D-8.

As in the case of Mappings A and B, the defendants contend that the 512B/513B mapping standards do not infringe the '405 patent because the data words and the data indicator are not "combin[ed]" to "generate an encoded information stream." For that reason, the defendants argue, the 512B/513B mapping standards do not satisfy claim limitations 1(b) or 8(a), which require that the data words and the data indicator be "includ[ed]" in a single encoded information stream. In Mapping C, as in the G.7041 standard, the flag bits for each of the eight information groups in the superblock are placed in a trailing octet at the end of the superblock, separate from the corresponding data words. In Mapping D, the flag bits for the two information groups are grouped first and are transmitted immediately before the two information groups.

Applying the Court's claim constructions, limitations 1(b) and 8(a) both require that the data indicator and the data words be combined or included in the same encoded information stream. The encoded data is transmitted in a superblock in the case of Mapping C, and in a pair of blocks in the case of Mapping D. As a result, multiple flag bits are combined and transmitted together, and they are transmitted separately from their corresponding data words. Therefore, it is clear that the final encoded output of each mapping does not infringe the '405 patent.

In its opposition to the defendants' motion for summary judgment, Sycamore did not argue that Mappings C and D perform a two-step process, the alternative infringement argument that Sycamore made with respect to Mappings A and B. See Dkt. No. 245, at 6–7 (in the context

of its two-step theory, discussing only Figures 8-2 and 8-3 of the G.7041 standard and creating a 64B/65B code block). However, Sycamore raised that argument in its supplemental brief addressing Dr. Gorshe's White Papers. Dkt. No. 514, at 4. In his 2011 White Paper, Dr. Gorshe wrote that in Mapping C, the "64B/66B line codes are first transcoded into 512B/513B block codes" and then "eight 513B blocks are grouped in a 16-block (64-octet) superblock." Dkt. No. 509-2, at 55. Similarly, Dr. Gorshe wrote that in Mapping D, "[t]he 1024B/1027B block code is constructed as a concatenation of two 512B/513B block codes." Id. at 50.

In its supplemental brief, Sycamore also argued that the standard itself requires that an infringing contiguous 513-bit block be formed. Dkt. No. 514, at 4. For Mapping C, the 2012 G.709 standard is performed by "transcoding a group of eight 66B blocks into one 513B block (as described in Annex B)" and then "assembling eight 513B blocks into one 516-octet superblock," wherein "the leading flag bits from each of the eight 513B blocks are relocated into a single octet at the end of the 513-octet superblock data field." Dkt. No. 185-4, at 95–96. Similarly, Mapping D is described as creating a flag parity bit "across two 513B blocks." Id. at 191.

As with Mappings A and B, however, Sycamore has not met its burden of showing that an infringing 513-bit block is generated. Sycamore offers no evidence or expert testimony that these 513-bit blocks must consist of contiguous bits, and the defendants offer expert testimony to suggest that implementing the standard would not require generating a continuous 513-bit block before further encoding the superblock or interleaved structure of Figure 17-18 or Figure F.1, respectively. See Dkt. No. 185-10 ¶¶ 252–62; id. ¶ 271 (Lanning Report: "Indeed, although I have not been shown evidence of the internal implementation of the line cards, in my opinion it is more likely that the line cards would generate the superblock in the final format. This is my

opinion because such rearrangement would be wasteful and would require additional time (thus potentially leading to communications latency), as well as additional computational resources (thus potentially leading to greater power consumption and additional circuitry).”). Because Sycamore has failed to meet its burden to show that there is any evidence that Mappings C and D require the generation of a continuous series of 513 bits in order to perform a two-step encoding process, and because the final encoded outgoing stream does not combine or include the transition indicator and the data words in a single encoded information stream, summary judgment for the defendants is appropriate.

3. Infringement of Claim Limitations 1(c)(i) and 8(b)

The defendants further contend that Mappings C and D do not satisfy claim limitations 1(c)(i) and 8(b) of the ’405 patent, which recite encoding “control characters to control codes.” With respect to those limitations, the defendants assert that there are two flaws in Sycamore’s infringement theory: First, they contend that the control blocks in the 64B/66B input information cannot constitute “control characters” because the blocks can contain data words in addition to control information. Second, they note that only the eight-bit “block type” field is encoded, while the remaining 56 bits of the control block are incorporated without change in the encoded information stream; for that reason, they contend, these mappings do not “encode” control characters. Dkt. No. 193, at 16–17; Dkt. No. 255, at 11–15. Neither argument is persuasive.

Under the Court’s construction, a “control character” is defined by the line encoding standard that the accused infringing device uses as input. According to Sycamore’s infringement theory regarding Mappings C and D, each “information group” comprises eight 64B/66B blocks. Dkt. No. 185, at 16; see also Dkt. No. 159-1, at C-1. Under both standards, “[e]ach 66B

codeword . . . is one of the following: a set of eight data bytes with a sync header of ‘01’; or a control block . . . beginning with a sync header of ‘10’.” Dkt. No. 185-4, at 164. Each control block can be one of 15 block types, and each control block can contain either exclusively control information or a mixture of control and data information. Id. at 164, 166. The control block contains a leading byte that in turn contains a block type field. Id. at 166, 168. When the mapping standard receives a 66B control block, it is “encoded into a row of the [512B/513B] structure shown in Figure B.3” by first removing the sync header “10,” then translating the 8-bit control block type field into a 4-bit code, and finally generating a flag continuation bit and a position indicator of three bits. Id. at 168.

This encoding process satisfies the encoding “control characters into control codes” limitations of claims 1 and 8. The accused “control character” in these mappings is the control block, which is defined in the 64B/66B line encoding scheme as consisting of 64 payload bits and 2 bits of overhead. See, e.g., id. (using the phrase “66B control block” 13 times on a single page when describing the encoding process for the accused mappings). The accused mappings reduce an eight-bit segment of each of the 66-bit control blocks into four bits. The accused mappings, like the ’405 patent, rely on the line encoding standard to determine what constitutes a “control block.” Under the Court’s construction of “control character,” the fact that the control block may contain data words does not preclude infringement. Moreover, the mapping standards are clear that the 8-bit block type field is part of the incoming 66B control block, and that the 8-bit type field is converted into a form that comprises fewer bits. Nothing more is required to satisfy the two disputed limitations.

C. Remaining Issues Relating to Infringement

In the course of the summary judgment briefing, Sycamore stated that it was not pursuing a theory of indirect infringement. Dkt. No. 245, at 1. That issue, which was raised in the defendants' motion for summary judgment, is therefore moot. Because the Court grants the defendants' motion as to non-infringement, their argument about no willful infringement is also moot. With respect to Sycamore's motion for summary judgment on the scope of Level 3's infringement, Dkt. No. 191, the Court's disposition of the summary judgment motions regarding infringement of the accused mapping standards make it unnecessary to address the infringement contentions in that motion. That motion is therefore DENIED AS MOOT. For the same reason, Sycamore's infringement-related motions directed to AT&T and CenturyLink are DENIED AS MOOT, specifically: Sycamore's Motion for Summary Judgment on AT&T's Infringement of the Sycamore Patent, Dkt. No. 205; and Sycamore's Motion for Summary Judgment on the Scope of CenturyLink's Infringement, Dkt. No. 206. Finally, at this time, the Court need not address AT&T's Motion to Strike Plaintiff's Late-Disclosed Infringement Theories, Dkt. No. 417; or CenturyLink's Additional Opposition to Sycamore's Motion for Partial Summary Judgment of Infringement by Performing the Accused Mappings Pursuant to the Accused Standards, Dkt. No. 270.

III. Motions Relating to Defenses

A. Invalidity Under 35 U.S.C. §§ 102(a) and 102(f) (2006)[7]

1. Background

In the fall of 2000, Dr. Danny Tsang took a sabbatical from Hong Kong University of Science and Technology and joined Sycamore Networks, a predecessor-in-interest to plaintiff Sycamore IP Holdings LLC. While at Sycamore Networks, Dr. Tsang worked with his manager, Dr. Murat Azizoglu, on an encoding scheme to transport Gigabit Ethernet signals over SONET systems. On December 5, 2000, Sycamore Networks filed U.S. Provisional Patent Application No. 60/251,341 (the "Provisional Application"), which described Dr. Tsang's encoding scheme and named Dr. Tsang and Dr. Azizoglu as the inventors. Dkt. No. 179-4. The Provisional Application described methods of encoding Gigabit Ethernet signals for transmission over a SONET network by encoding the control codes and grouping multiple data words or control codes together for more efficient transmission.

From at least August 2000 until July 2001, Sycamore Networks was a member of the Alliance for Telecommunications Industry Standards ("ATIS"), a standards-setting organization that is accredited by the American National Standards Institute ("ANSI"). ANSI accredited and ATIS sponsored the T1 Standards Committee, which included a working group called T1X1.5 that was working on protocols for encoding data over SONET. The T1X1.5 working group was ultimately responsible for developing a proposal for transparent encoding that became one of the foundations of the four accused mappings at issue in this case.

[7] The language of section 102 was significantly amended by the Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284 (2011). However, the former version of section 102 applies to this case because the AIA amendments to section 102 apply only to patents with an effective filing date of March 16, 2013, or later. See id. § 3(n), 125 Stat. at 293; Solvay S.A. v. Honeywell Int'l Inc., 742 F.3d 998, 1000 n.1 (Fed. Cir. 2014).

Dr. Tsang and Dr. Yang Cao, another employee of Sycamore Networks, were participants in the T1X1.5 working group. Dr. Tsang participated in the working group from approximately October 2000 to March 26, 2001. In the weeks after he submitted the Provisional Application, Dr. Tsang approached Dr. Gorshe of PMC-Sierra and Mike Scholten of Applied Micro Circuits Corp. ("AMCC") to propose presenting his transparent encoding scheme to the T1X1.5 working group. PMC-Sierra and AMCC were both members of the T1X1.5 working group, and Dr. Gorshe was the technical editor of the group. Dr. Tsang informed Dr. Gorshe and Mr. Scholten that he had a patent application pending on his encoding scheme.

On December 8, 2000, Mr. Scholten wrote to Dr. Tsang via e-mail stating that he believed Dr. Tsang's proposal "represents a simpler, more generic approach than the current T1X1 proposal" and that "AMCC would like to support and co-author this contribution with you." Dkt. No. 257-6, at MC000015–16. However, Mr. Scholten emphasized that "we can't do that unless Sycamore publicly indicates they will not use their pending patent to charge royalties or restrict use of this scheme." Id. at MC000016. Dr. Tsang wrote back that "Sycamore will not charge AMCC for the 64B/65B licensing fee" and suggested that "it may be politically better if AMCC can present the proposal at T1X1.5." Id. at MC000015. Mr. Scholten said this was "good news" and agreed to present Dr. Tsang's proposal at the January 2001 T1X1 meeting. Id. at MC000014.

Dr. Tsang first approached Dr. Gorshe on December 13, 2000. As with AMCC, Dr. Tsang offered Dr. Gorshe's company, PMC-Sierra, a royalty-free license to any patent issuing from the Provisional Application. See Dkt. No. 257-5, at 230:21–231:6 (Dr. Tsang testifying in deposition that "Because they . . . are co-author of the proposal, after checking with Rick Barry [of Sycamore Networks], he agree Sycamore would not charge the co-author of these two

company licensing fee for using the technology.”). During a conference call on December 19, 2000, that included Dr. Tsang, Dr. Gorshe explained that the ANSI patent policy required that any patented technology that is included in the standard would have to be available royalty free or under reasonable and non-discriminatory terms. Dkt. No. 257-6, at MC000006; Dkt. No. 257-17, at 78:13–79:22. Dr. Gorshe’s notes from that conference call indicate that Dr. Tsang represented that Sycamore Networks “won’t charge patent royalties to chip vendors who support them up front” and “won’t [charge] big royalties in any case.” Dkt. No. 257-6, at MC000005.

The T1 Standards Committee applied ANSI’s patent policy, which in October 2000 provided as follows:

> **14.2 Statement from Patent Holder**
>
> Prior to approval of such a proposed American National Standard, ANSI shall receive from the patent holder (in a form approved by ANSI) either: assurance in the form of a general disclaimer to the effect that the patentee does not hold and does not anticipate holding any invention whose use would be required for compliance with the proposed American National Standard or assurance that:
>
> (1) A license will be made available without compensation to applicants desiring to utilize the license for the purpose of implementing the standard, or
>
> (2) A license will be made available to applicants under reasonable terms and conditions that are demonstrably free of any unfair discrimination.

Dkt. No. 257-15, at ATIS002562. ANSI has stated that its patent policy does not apply to pending patent applications, Dkt. No. 182-12, at SYC0026714 (May 2003 ANSI document elaborating on patent policy); Dkt. No. 182-13, at 6 (May 2004 ANSI document stating the same), and the Vice President and General Counsel of ANSI testified to the same effect before the Federal Trade Commission and the Department of Justice in April 2002, Dkt. No. 182-20, at SYC0026698.

Dr. Tsang, Dr. Gorshe, and Mr. Scholten collaborated on a series of proposals regarding their transparent encoding scheme, which were submitted to the working group on December 22,

2000, December 29, 2000, and January 8, 2001. As of December 26, 2000, Dr. Gorshe devised a revision to Dr. Tsang's encoding scheme that rearranged some of the fields so that the output would be byte-aligned—that is, Dr. Gorshe's revision ensured that information fields would be self-contained within the same byte, rather than spanning across more than one byte. Dr. Gorshe's idea was included in the trio's December 29 submission to the working group. The encoding scheme, with Dr. Gorshe's revisions, was adopted by the working group and was made a part of the draft standard in January 2001.

On February 27, 2001, Sycamore Networks filed U.S. Patent Application No. 09/794,949 ("the '949 application" or "the Non-Provisional Application"). That application claimed priority to the December 5, 2000, Provisional Application. The '949 application issued as the '405 patent in October 2005. The specification of the Non-Provisional Application was significantly expanded from the Provisional Application.

Meanwhile, in June 2001, the T1X1 subcommittee began working with the ITU-T Study Group to create a final version of the standard. The ITU-T Study Group integrated the T1X1 encoding scheme into the ITU-T's final adopted standard for GFP-T in the August 2005 ITU G.7041 recommendation. Dr. Gorshe was involved in the development of the standard for the ITU-T. Sycamore Networks was not a member of the ITU, and neither Sycamore Networks nor Dr. Tsang was listed in connection with the draft ITU-T recommendation or the June 2001 ITU-T meeting.

2. Discussion

The defendants have moved for summary judgment of invalidity of the '405 patent under 35 U.S.C. §§ 102(a) and 102(f). Their claim of invalidity focuses on the use of the term "transition indicator" in the '405 patent. Based on the language of the patent, the Court

construed "transition indicator" to mean "one or more bits that indicate the occurrence of a final control code in an encoded information stream." Dkt. No. 110, at 11.

The defendants argue that the Provisional Application does not contain a written description of the claimed "transition indicator" and that, as a result, the '405 patent is not entitled to priority as of the December 5, 2000, filing date of the Provisional Application. Instead, the defendants contend that the "transition indicator" was invented only when Dr. Gorshe devised his byte-aligned revision to Dr. Tsang's encoding scheme.[8] Accordingly, the defendants argue that the asserted claims of the '405 patent are invalid under 35 U.S.C. § 102(f) because the patent fails to name Dr. Gorshe as one of the joint inventors. In addition, they contend that the asserted claims are invalid under 35 U.S.C. § 102(a) because the submission made to the working group by Dr. Gorshe, Dr. Tsang, and Mr. Scholten on December 29, 2000, anticipates the claims of the '405 patent if that patent is not entitled to the priority date of the Provisional Application. Sycamore responds that the Provisional Application provides written description support for the transition indicator, and that Dr. Gorshe was not a co-inventor of the '405 patent because his revisions of Dr. Tsang's coding scheme merely rearranged elements of Dr. Tsang's invention in a way that was not required by any limitation of the asserted claims.

The term "transition indicator" appears in three of the asserted claims. Independent claim 1 recites "generating a <u>transition indicator</u> based on the number of control characters for indicating the occurrence of a final control code in the encoded information stream." Claim 7, which depends from claim 1, recites "based on the value of said <u>transition indicator</u>, determining

[8] The defendants do not argue that the '405 patent is invalid because Dr. Gorshe invented the byte-aligned modification, presumably because the patent does not claim byte alignment as a limitation. Rather, Dr. Gorshe claimed the byte-aligned encoding in U.S. Patent No. 7,127,653, which issued in October 2006 but claims priority to a provisional application filed on July 5, 2001.

the locations of said location pointers, said control codes, and said data words in said encoded information stream." And independent claim 8 recites "encoding control characters to control codes, generating a transition indicator and location pointers, and combining said control codes, said transition indicator, said location points, and any data words present in said information group to form said encoded information stream when one or more control characters are included in said information group." As the Court stated in its claim construction order, the '405 patent's specification supports the description of the transition indicator as referring to the portion of the encoded information stream that indicates the occurrence of the final control code in the stream. Dkt. No. 110, at 7 (citing '405 patent, col. 5, ll. 20–22; id., col. 5, ll. 38–39; id., col. 5, ll. 41–43; id., col. 6, ll. 17–20).

For the '949 application to claim priority to the Provisional Application, "the specification of the provisional must contain a written description of the invention . . . in such full, clear, concise, and exact terms, to enable an ordinarily skilled artisan to practice the invention claimed in the non-provisional application." New Railhead Mfg., L.L.C. v. Vermeer Mfg. Co., 298 F.3d 1290, 1294 (Fed. Cir. 2002) (quoting 35 U.S.C. § 112 ¶ 1) (quotation marks and citation omitted). In other words, "the written description of the provisional must adequately support the claims of the non-provisional application." Id. To satisfy the written description requirement of 35 U.S.C. § 112, "the disclosure of the application relied upon [must] reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." Ariad Pharm., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). The written description requirement does "not demand any particular form of disclosure, or that the specification recite the claimed invention in haec verba." Id. at 1352

(citation omitted). However, "a description that merely renders the invention obvious does not satisfy the requirement." Id.

The question, therefore, is whether the Provisional Application conveys that the inventors of the '405 patent possessed the idea of what is disclosed in the Non-Provisional Application as the "transition indicator," i.e., one or more bits that indicate the occurrence of the final control code in an encoded information stream.

The defendants argue that the Provisional Application's description of the structure that Sycamore contends became the transition indicator is fundamentally different from the "transition indicator" that is described and claimed in the '405 patent. The defendants point to the following text in the Provisional Application:

> However, if the rate optimizing encoder determines that control code words are present, the control location field is generated. The first part of the control location field includes a variable number of bits, each indicating the presence of a corresponding code word. After all of the input words have been received and therefore all of the control code words have been detected, a zero is inserted in this field to indicate the end of the first part of the variable field. For example, if three control code words are detected, the first part of the control location field is 1110 and if seven control code words are detected, the field is 11111110.

Provisional Application at 15 (emphasis added). The defendants point out that the Provisional Application's "encoding scheme begins with a variable length field that is used to count control codes, and the '0' bit is used to end the counting. The scheme has no need for a bit that 'indicate[s] the occurrence of a final control code.' Instead, the rules of this scheme rely on beginning the encoded stream with a variable number of '1' bits that indicate how many control codes are present when counted." Dkt. No. 179, at 14. The defendants contend that the function described in the Provisional Application "is indisputably different than the function of the claimed transition indicator." Dkt. No. 281, at 2. Specifically, the defendants argue that the "0" bit in the Provisional Application indicates "stop counting"—that is, the previous "1" bit

indicates the occurrence of the last control code—whereas in the ’405 patent, the “0” bit itself indicates the last control code.

The defendants’ argument distinguishing the Provisional Application’s encoding scheme from the ’405 patent is strained, as the encoding scheme described in the Provisional Application is identical to the one described in the specification of the ’405 patent:

> The rate optimizing encoder 210 detects the control characters present in the information group and generates the information for storing in the first and second fields 414 and 418. When at least one control code is detected, the first field 414 includes a variable number of bits 414_1, . . . 414_w including a transition indicator (preferably the last bit of the first field 414) for indicating that no more control characters are present in the information group. For instance, the first field 414 may include bits 414_1 . . . 414_{w-1} set to a first logical level for each time that a control character is detected, to function as control code counters. The last bit 414_w (the transition indicator) is set to a second logical level opposite to the first logical level when there are no more control characters within the information group, to indicate the end of the first field 414. . . . For example, if four control characters are detected in the information group, the first field 414 includes five bits set to “11110”, where the first “1” bit indicates that at least one control code is present, the next three “1” bits each indicate the presence of control codes, and the “0” bit or transition indicator 414_w indicates the last control code within the encoded information stream 400 . . . .

’405 patent, col. 5, ll. 15–39 (emphasis added).

The defendants’ characterization of the disclosure of the Provisional Application takes an unjustifiably restrictive view of the Provisional Application’s disclosure. The Provisional Application makes clear that the first variable field of the “data/control sequence field” serves to “indicate[] where the control code words are positioned in the data stream.” Provisional Application at 12–13. That variable field is a “set of bits for indicating which of the signal blocks contains a control code.” Id. at 7; see also id. at 8 (“The position of the data and encoded control code words corresponding to their positions indicated by the data/control sequence field.”). Accordingly, “[t]he number of consecutive set bits before the first zero bit occurs are counted to determine the number of control fields that are present.” Id. at 16–17. The “0” bit at

the end of the variable field is therefore necessary to determine which control code is the final one, thereby indicating the occurrence of the final control code in the stream. Although the language was revised, the scope of the disclosure is the same.

In sum, the evidence before the Court does not support the defendants' argument that the Provisional Application lacks written description support for the '405 patent's "transition indicator." For that reason, the evidence offered by the defendants fails to show that the '405 patent is not entitled to the Provisional Application's priority date. Accordingly, the defendants have failed to show that the '405 patent is anticipated by the December 29, 2000, submission to the T1X1.5 working group. For similar reasons, the Court concludes that the defendants have failed to show that Dr. Gorshe must be regarded as the inventor of the "transition indicator." The patent has therefore not been shown to be invalid under 35 U.S.C. § 102(f), for failure to name Dr. Gorshe as an inventor. Accordingly, the defendants' motion for summary judgment of invalidity under sections 102(a) and 102(f) is DENIED.

B. Invalidity Under Section 101

The defendants have moved for summary judgment invalidating all the asserted claims of the '405 patent as patent ineligible under 35 U.S.C. § 101. The defendants contend that the claims of the '405 patent fail to satisfy the eligibility requirement of section 101 because they are directed to an abstract idea and lack an inventive concept. Dkt. No. 180. Because the encoding procedure claimed in the '405 patent effectively reduces the bandwidth of certain communications without sacrificing the content of the communicated information, Sycamore argues that the invention solves a technical problem in the computer networking field in an inventive manner, rather than simply claiming an abstract idea as the patentable invention. See Amdocs (Israel) Ltd. v. Openet Telecom, Inc., 841 F.3d 1288, 1300 (Fed. Cir. 2016) (holding an invention patentable if claims are "directed to an improvement in computer functionality" or

"solve a technology-based problem, even with conventional, generic components, combined in an unconventional manner"). For that reason, Sycamore contends that the defendants are not entitled to summary judgment of patent ineligibility with respect to the asserted claims of the '405 patent.

As articulated by the Supreme Court, the analysis of patent eligibility under section 101 entails two steps. Step one requires the Court to "determine whether the claims at issue are directed to a patent-ineligible concept" such as an abstract idea. Alice Corp. Pty. v. CLS Bank Int'l, 134 S. Ct. 2347, 2355 (2014). If so, the Court proceeds to step two, which requires the Court "to consider the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." Id. (quoting Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66, 78–79 (2012)). In that step, the Court searches "for an 'inventive concept'—i.e., an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" Id. (alteration in original) (quoting Mayo, 566 U.S. at 72–73).

In arguing that the '405 patent is not directed to a patent-ineligible concept, Sycamore points out that the patent identifies a problem that arose in the conversion of information from one computer signal protocol to another. The patent, according to Sycamore, teaches a concrete technical solution that reduces the number of bits required to transmit a particular communication across those different protocols without losing any portion of the communication. Moreover, even assuming the patent is regarded as being directed to an abstract idea, such as merely encoding and decoding data, Sycamore argues that the evidence before the

Court shows that the patented method effects an improvement over the prior art and contains an inventive concept.

The defendants begin by arguing that claim 1 of the ’405 patent does not expressly require compression, i.e., a reduction in the number of bits without loss of content, and that in light of dependent claim 4, which does require compression, claim 1 cannot be analyzed as if it were directed to an encoding scheme that results in compression of the transported message. The Court disagrees with the defendants’ characterization of claim 1. In describing the invention, the specification of the ’405 patent states that as a consequence of the claimed coding protocol, “the necessary bandwidth for transporting the information is reduced after the encoding is completed without sacrificing any control information so that the information is transparently and efficiently transported over the communications link.” ’405 patent, col. 2, ll. 36–40; see also id., col. 6, ll. 50–53 (“The coding scheme according to the embodiments of the present invention allows information to be transparently transported across the network at a reduced data rate . . . .”); id., Abstract (“[T]he necessary bandwidth for transporting the information is reduced by using this encoded information stream without sacrificing any control information.”).

The ’405 patent is so clearly directed to a method for compression that it is difficult to interpret claim 1 as serving any function other than compression. That is so even though compression is not expressly required by claim 1 and even though dependent claim 4 adds the requirement of compression, which would normally call for application of the doctrine of claim differentiation. Indeed, the Court’s construction of the claim term “encoding control characters”

to mean "converting at least a portion of each present control character into a form that comprises fewer bits" indicates that the Court construes claims 1 and 8 to require compression.[9]

The defendants also argue that the claims of the '405 patent "recite no computer" and "do not call for any form of computer implementation of the claimed methods." Dkt. No. 180, at 8. For that reason, they argue that the claims cannot be defended on the ground that they address computer-related functionality. That argument, however, is based on an unsupportable reading of the claims. The defendants' own proposed claim constructions repeatedly define particular claim terms by reference to "bits" and "series of bits." See Dkt. No. 104 (e.g., defining "information group" to mean "a series of bits comprising . . ."; "control characters" to mean "bits in an information group . . ."; "location pointer" to mean "one or more bits . . ."; and "data indicator" to mean "one or more bits . . ."). Those constructions effectively acknowledge that the invention operates in a digital communication system that is, in all practical applications, computer driven.

For purposes of the first step of the section 101 analysis, the Federal Circuit has distinguished between claims that "are directed to an improvement to computer functionality versus being directed to an abstract idea." Enfish, LLC v. Microsoft Corp., 822 F.3d 1327, 1335 (Fed. Cir. 2016); see Alice, 134 S. Ct. at 2358–59 (distinguishing the patent-ineligible claims at issue in that case from claims that "purport to improve the functioning of the computer itself," or that "improved an existing technological process"); DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1257 (Fed. Cir. 2014) (claims are not drawn to an abstract idea because "the

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[9] Even if claims 1 and 8 were invalidated as patent-ineligible based on the absence of an express requirement of compression, the case against the defendants would not be affected in any material respect, since claim 4 is asserted as well as claim 1, and claim 4 explicitly requires compression. That claim recites: "The method according to claim 1, wherein the number of bits in the encoded information stream is less than the number of bits in said information group."

claimed solution is necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks”).

The defendants argue that the claims in this case, unlike claims in other cases that have survived challenge under section 101, do not recite any features directed to improving computer functionality. That argument is unpersuasive. Compression of signals can be important to computer-driven communication functions, as is the case with increasing the speed of searching, reducing the need for memory, and increasing the efficiency of storage and retrieval of data. See Enfish, 822 F.3d at 1337. In that regard, a compression protocol is not fundamentally different from other computer-driven programs that improve the accuracy, speed, and security of communications such as error correction programs, encryption protocols, and methods for synchronizing data, all of which have been held to survive section 101 challenges without serious doubts as to their patentability. See Synchronoss Techs., Inc. v. DropBox Inc., 226 F. Supp. 1000, 1007–09 (N.D. Cal. 2016); MAZ Encryption Techs. LLC v. Blackberry Corp., C.A. No. 13-304, 2016 WL 5661981, at *5–8 (D. Del. Sept. 29, 2016); France Telecom S.A. v. Marvell Semiconductor Inc., 82 F. Supp. 3d 987, 1004 (N.D. Cal. 2015); TQP Dev., LLC v. Intuit Inc., No. 2:12-cv-180, 2014 WL 651935, at *2–7 (E.D. Tex. Feb. 19, 2014).

Citing several Federal Circuit decisions, the defendants argue that in similar circumstances, the Federal Circuit has held analogous claims patent-ineligible. None of the cases cited by the defendants, however, compels the conclusion that the claims of the ’405 patent are patent-ineligible under section 101.

The case on which the defendants most heavily rely is RecogniCorp, LLC v. Nintendo Co., 855 F.3d 1322 (Fed. Cir. 2017). The patent claims in that case were very general. In essence, the claims were drawn to a method and apparatus for building a composite facial image

by taking facial features on a display, assigning them image codes using a mathematical operation, and reproducing the image on another display based on the codes. Id. at 1324. The Federal Circuit upheld the district court's determination that the claims were unpatentable. It concluded that the claims were directed to an abstract idea—the mere operation of encoding and decoding data, "an abstract concept long used to transmit information." Id. at 1326. Citing Digitech Image Technologies, LLC v. Electronics for Imaging, Inc., 758 F.3d 1344 (Fed. Cir. 2014), the court explained that a process that "starts with data, adds an algorithm, and ends with a new form of data is directed to an abstract idea." RecogniCorp, 855 F.3d at 1327.

The defendants say that is this case. While it is true that the invention in this case involves the manipulation of data, the point of the invention is not simply the transmission of data in coded form, but the conversion of the data into a form that makes the communication of the data more efficient. The specific function of the recited encoding scheme is to add efficiency to the process in a particular manner. As such, the recited protocol, even though expressed (as are all computer operations) as an algorithm, is a concrete technical contribution and not simply the embodiment of an abstract idea.

A recent decision from this court is on point and illustrates the distinction nicely. In that case, Realtime Data, LLC v. Carbonite, Inc., Case No. 6:17-cv-121, 2017 WL 4693969 (E.D. Tex. Sept. 20, 2017), the court held a patent on a system for compressing data to be patent eligible. The court distinguished RecogniCorp on the ground that the invention was "not simply encoding and decoding," but made a technical improvement in the process of data compression, resulting in real-time or pseudo-real-time compression. Id. at *5.

Essentially the same analysis applies to the other two cases on which the defendants principally rely, Synopsys, Inc. v. Mentor Graphics Corp., 839 F.3d 1138 (Fed. Cir. 2016), and

Intellectual Ventures I LLC v. Symantec Corp., 838 F.3d 1307 (Fed. Cir. 2016). The Synopsys court described the claims at issue as "drawn to the abstract idea of translating a functional description of a logic circuit into a hardware component description of the logic circuit." 839 F.3d at 1150. That translation, the court explained, is a mental process. Id. Moreover, the court concluded that the asserted claims failed step two of the section 101 analysis because they lacked an inventive concept. As the court put it, the claim did not involve a "technical solution [that] overcame defects in prior art embodiments." In addition, as the court noted, the claims added nothing inventive that took the asserted claims "beyond their abstract idea." Id. at 1152.

The Symantec case involved claims directed to methods of screening e-mails that the court characterized as "receiving e-mail (and other data file) identifiers, characterizing e-mail based on the identifiers, and communicating the characterization—in other words, filtering files/e-mail." 833 F.3d at 1313. That function, the court explained, was an abstract idea, akin to an individual discarding certain mail from unwanted sources based on the relevant characteristics of the letters. Id. at 1314. A recent decision by the author of Symantec summarized the holding of that case succinctly: "We determined in [Symantec] that '[b]y itself, virus screening is well-known and constitutes an abstract idea.' We also found that performing the virus scan on an intermediary computer—so as to ensure that files are scanned before they can reach a user's computer—is a 'perfectly conventional' approach and is also abstract." Finjan, Inc. v. Blue Coat Sys., Inc., 879 F.3d 1299, 1304 (Fed. Cir. 2018). In Finjan, however, the court held that the claimed "behavior-based" approach to virus scanning constituted an improvement to computer functionality and was patent-eligible subject matter. Id. at 1304–05; see also id. at 1305 ("Here, the claims recite more than a mere result. Instead, they recite specific steps . . . that accomplish the desired result.").

The invention at issue in this case, unlike the inventions in Synopsys and Symantec, proposed a specific technical solution to a specific problem in telecommunications, i.e., creating a method for compressing data in a transparent manner. Unlike the invention in Symantec, the invention in this case has no direct analog outside the computer-driven communications field. And like Finjan and unlike the invention in Synopsys, the invention in this case was not simply to substitute one description of a circuit component for another, but entailed a technical solution for a problem that resulted in a physical reduction in the bandwidth necessary to send particular communications.

Even if the asserted claims of the ’405 patent are regarded as directed to an abstract idea, such as compressing data to facilitate network communications, the defendants must establish that the claims fail step two of the section 101 analysis. That step provides that even when claims are deemed to be directed to an abstract idea, they are not patent ineligible if they embody an inventive concept by reciting a “specific, discrete implementation of the abstract idea.” See BASCOM Global Internet Servs., Inc. v. AT&T Mobility LLC, 827 F.3d 1341, 1350 (Fed. Cir. 2016). The claimed invention recites a specific method of coding to effect compression, including the use of specific field types, including a data indicator, a transition indicator, and a location pointer, which provide information regarding the presence and location of control characters. In their summary judgment motion, the defendants have not shown that the claims lack a sufficiently specific inventive concept and thus do no more than “simply instruct the practitioner to implement the abstract idea” on generic components. Alice, 134 S. Ct. at 2359.

In sum, the Court holds that, at a minimum, it is not clear on the summary judgment record before the Court that the asserted claims of the ’405 patent are directed to an abstract idea and do not embody an inventive concept, within the meaning of section 101. See Berkheimer v.

HP Inc., No. 2017-1437, 2018 WL 774096, at *6–8 (Fed. Cir. Feb. 8, 2018). The motion for summary judgment invalidating all of the asserted claims as patent-ineligible is therefore DENIED.

C. Invalidity Under Equitable Estoppel, Fraud, Patent Misuse, Laches, Unclean Hands, and Waiver

Sycamore has moved for summary judgment on the defendants' affirmative defenses of equitable estoppel, fraud, patent misuse, laches, unclean hands, and waiver. Dkt. No. 183. In opposition, the defendants indicate that they do not intend to pursue their defenses of fraud or unclean hands. Dkt. No. 256, at 2 n.2. With respect to the defendants' laches defense, the parties agree that it is a defense only as to claims for equitable relief, and Sycamore has not moved for summary judgment on that ground. See Dkt. No. 291, at 5 n.10 ("Sycamore disputes that Defendants would have a laches defense if Sycamore were to later seek equitable relief for Defendants' infringement. But the Court need not decide that issue now." (citation omitted)); see also Dkt. No. 256, at 15. The Court holds that the defendants have not presented a cognizable theory of patent misuse. The Court concludes, however, that disputes of fact preclude summary judgment as to waiver and equitable estoppel for some, but not all, of the defendants' theories.[10] Accordingly, Sycamore's motion is GRANTED as to fraud, unclean hands, and patent misuse, DENIED as to laches and waiver, and GRANTED IN PART and DENIED IN PART as to equitable estoppel.

The defendants' equitable estoppel, patent misuse, and waiver defenses are predicated primarily on Dr. Tsang's conduct in connection with the T1X1.5 working group. They argue that Sycamore Networks had a duty under the T1 Standards Committee's patent policy to disclose Dr. Tsang's provisional application when he proposed its use to the working group, and

[10] CenturyLink does not assert the defense of equitable estoppel.

that his failure to disclose renders the patent unenforceable. In addition, the defendants argue that even absent a duty to disclose, Dr. Tsang's conduct in the working group was so inequitable and anticompetitive as to bar the recovery of royalties in this case.

A participant in a standard-setting organization may be equitably estopped or may waive its right to assert infringement claims against products that practice the standard. Hynix Semiconductor Inc. v. Rambus Inc., 645 F.3d 1336, 1348 (Fed. Cir. 2011); see also Qualcomm Inc. v. Broadcom Corp., 548 F.3d 1004, 1020–24 (Fed. Cir. 2008). To establish implied waiver, the defendants must show that the patentee's "conduct was so inconsistent with an intent to enforce its rights as to induce a reasonable belief that such right has been relinquished." Hynix, 645 F.3d at 1348 (quoting Qualcomm, 548 F.3d at 1020). And to establish equitable estoppel, the defendants must show that the patentee, "through misleading conduct, led the alleged infringer to reasonably infer that the patentee does not intend to enforce its patent against the alleged infringer." Id. (quoting A.C. Aukerman Co. v. R.L. Chaides Constr. Co., 960 F.2d 1020, 1028 (Fed. Cir. 1992) (en banc)). Such misleading conduct can include "specific statements, action, inaction, or silence where there was an obligation to speak." Id. (quoting Aukerman, 960 F.2d at 1028).

The defendants have raised triable disputes of fact as to this theory of waiver and equitable estoppel. First, there is a dispute of fact as to the scope of the ANSI patent policy. Both Sycamore and the defendants contend that the language of the ANSI patent policy unambiguously supports its own interpretation of the policy. Dkt. No. 183, at 8 (Sycamore: "The written policy is clear on its face: only disclosure of 'patented items' is required. Because the policy is unambiguous . . . ."); Dkt. No. 256, at 10 (Defendants: "Defendants agree with Sycamore IP that the Committee T1 patent policy is unambiguous. . . . The plain language of the

Committee T1 policy required the disclosure of Sycamore Networks' patent application."). The Court finds that the language of the patent policy is not unambiguous.

On the one hand, the policy is limited to a "patent holder" and a "patentee": "ANSI shall receive from the patent holder . . . assurance . . . that the patentee does not hold and does not anticipate holding any invention whose use would be required for compliance with" the proposed standard. Dkt. No. 257-15, at ATIS002562 (emphasis added). These terms generally apply only to parties who have been granted a patent or have acquired ownership of a patent. See 35 U.S.C. § 100(d) (defining "patentee" to include "not only the patentee to whom the patent was issued but also the successors in title to the patentee"). Dr. Tsang and Sycamore Networks, having only filed a provisional application at the time the presentation was made to the working group, would not be considered "patentees" under the statutory definition of that term.

On the other hand, the ANSI patent policy requires an assurance that the patentee "does not hold and does not anticipate holding any invention whose use would be required for compliance with the proposed" standard. Dkt. No. 257-15, at ATIS002562 (emphasis added). The defendants argue that Dr. Tsang anticipated holding a patent on his encoding scheme, as evidenced by his provisional and subsequent non-provisional patent applications. According to the defendants, Dr. Tsang therefore had a duty under the terms of the patent policy to disclose that he anticipated holding a patent on the invention at issue. Although the policy does not use the term "patent application," the use of the term "anticipates holding" suggests that the policy is not limited to patents that the participants presently hold, and could include pending or provisional applications. Sycamore's suggested reading of the phrase "anticipate holding"—to mean that the policy imposes a duty on patentees "who anticipate that a standard might

encompass their patent," Dkt. No. 291, at 3—contorts the phrase "anticipates holding," which appears to refer to a person who does not presently hold a patent.

Given the tension between those two readings of the text, the Court turns to extrinsic evidence, which is not conclusive in support of either interpretation. Sycamore presents evidence from ANSI in 2002, 2003, and 2004, including ANSI documents and testimony from its General Counsel, to support its contention that ANSI's patent policy did not apply to pending patent applications. Dkt. No. 182-12, at SYC0026714; Dkt. No. 182-13, at 6; Dkt. No. 182-20, at SYC0026698. For their part, the defendants offer testimony from two participants in the T1X1.5 working group—Dr. Gorshe and Deborah Brungard, the chair of the T1X1.5 working group in 2000—that they understood that patent applications were covered by the policy. Dkt. No. 256-3, at 244:13–246:17; Dkt. No. 257-17, at 260:20–261:14. Given the existence of this contested material fact, the Court is not prepared to conclude, for purposes of summary judgment, that Dr. Tsang and Sycamore Networks did not have a duty to disclose the Provisional Application.

Even if the ANSI patent policy did not impose a duty to disclose, other conduct by Dr. Tsang could give rise to a defense of waiver. At the least, Dr. Tsang's representations to Dr. Gorshe and members of the T1X1.5 working group that Sycamore Networks would not charge royalties to chip vendors who supported integrating Dr. Tsang's encoding scheme into the standard and that there would not be "big royalties in any case" raise triable questions of fact of the existence of express waiver. Dkt. No. 257-6, at MC000006. As Sycamore now seeks royalties on products made by the same chip vendors that supported Dr. Tsang's proposed encoding scheme, such conduct could be sufficient to satisfy the defendants' burden to show conduct "so inconsistent with an intent to enforce [Sycamore's] rights as to induce a reasonable

belief that such right has been relinquished." Hynix, 645 F.3d at 13489; see also Mars, Inc. v. TruRx LLC, No. 6:13-cv-526-RWS-KNM, 2016 WL 4055676, at *2 (E.D. Tex. Apr. 29, 2016) ("[N]othing in the [Federal Circuit's opinion in Qualcomm] indicated that implied waiver can only be established if a patentee is under a duty to disclose information to a standard setting organization . . . .").

Finally, AT&T and Level 3 raise another theory of equitable estoppel: that Sycamore Networks, in its business dealings with each company, failed to disclose that it had a patent that might cover the accused standards. Level 3 has been a customer of Sycamore Networks since 2005; a predecessor of AT&T installed Sycamore Networks equipment in its network; and Sycamore Networks submitted bids in response to AT&T's requests for information regarding network equipment. Sycamore notes, however, that the network equipment in question did not use any of the accused mappings.

This theory of equitable estoppel is unsuccessful. Equitable estoppel applies where a patent holder engages in misleading conduct that leads the alleged infringer "to reasonably infer that the patentee does not intend to enforce its patent against the alleged infringer." Hynix, 645 F.3d at 1348. "[S]ilence alone does not generate an estoppel," and the alleged infringer "'must show that, in fact, it substantially relied on the misleading conduct of the patentee in connection with taking some action.'" Aspex Eyewear Inc. v. Clariti Eyewear, Inc., 605 F.3d 1305, 1311 (Fed. Cir. 2010) (quoting Aukerman, 960 F.2d at 1042); see also Aukerman, 960 F.2d at 1043–44 ("[S]ilence alone will not create an estoppel unless there was a clear duty to speak or somehow the patentee's continued silence reenforces the defendant's inference from the plaintiff's known acquiescence that the defendant will be unmolested." (citation omitted)); Mars, Inc. v. TruRx LLC, 2016 WL 4034789, at *5. Here, the misleading conduct alleged by AT&T or

Level 3 consists only of Sycamore Networks' failure to volunteer information about a patent it held while it was conducting everyday business transactions unrelated to the patent. Under these circumstances, Sycamore Networks' silence cannot give rise to a viable defense of equitable estoppel.

Sycamore's motion is therefore DENIED as to waiver, and is GRANTED IN PART and DENIED IN PART as to equitable estoppel.

The Court reaches a different conclusion, however, with respect to the defendants' theory of patent misuse. The doctrine of patent misuse arose "from the desire to restrain practices that did not in themselves violate any law, but that drew anticompetitive strength from the patent right, and thus was deemed to be contrary to public policy." Qualcomm, 548 F.3d at 1025 (quoting B. Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1427 (Fed. Cir. 1997)). The doctrine was construed narrowly in Princo Corp. v. International Trade Commission, where the en banc Federal Circuit "emphasized that the defense of patent misuse is not available to a presumptive infringer simply because a patentee engages in some kind of wrongful commercial conduct, even conduct that may have anticompetitive effects." 616 F.3d 1318, 1328 (Fed. Cir. 2010) (en banc) (citing C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1373 (Fed. Cir. 1998)); see also, e.g., Soverain Software LLC v. J.C. Penney Corp., 899 F. Supp. 2d 574, 582 (E.D. Tex. 2012), rev'd on other grounds sub nom. Soverain Software LLC v. Victoria's Secret Direct Brand Mgmt., LLC, 778 F.3d 1311 (Fed. Cir. 2015). As explained in Princo, "the key inquiry under the patent misuse doctrine is whether . . . the patentee has impermissibly broadened the physical or temporal scope of the patent grant and has done so in a manner that has anticompetitive effects. Where the patentee has not leveraged its patent beyond the scope of rights granted by the Patent Act, misuse has not been found." 616 F.3d at 1328.

Here, the defendants have not set forth a theory of patent misuse that is consistent with the governing case law. The defendants' asserted defense of patent misuse is based solely on Dr. Tsang's purported violation of his duty to disclose the provisional patent to the T1X1.5 working group. Dkt. No. 256, at 12 (citing Qualcomm, 548 F.3d at 1022). Even assuming that Dr. Tsang had such a duty and a violation of that duty had anticompetitive effects, the evidence would be insufficient to support a defense of patent misuse, as there would be an absence of any factual allegation that Sycamore "impermissibly broadened the physical or temporal scope of the patent grant," particularly given the fact that the '405 patent had not issued at the time of the allegedly anticompetitive conduct. The Federal Circuit's 2008 opinion in Qualcomm only discussed patent misuse as an analogy in defining the scope of the defense of waiver, see 548 F.3d at 1024–27; the Federal Circuit's 2010 en banc decision in Princo expressly adopted the standard for patent misuse set forth above, see 616 F.3d at 1329, and that decision governs here. Accordingly, the Court holds that the defendants have not identified a viable theory of patent misuse, and Sycamore's motion for summary judgment is therefore GRANTED as to patent misuse.

D. Unenforceability for Inequitable Conduct

Sycamore has moved for summary judgment of no inequitable conduct, targeting the defendants' affirmative defense that all the claims of the '405 patent are unenforceable because of inequitable conduct by Sycamore. In particular, the defendants contend that Sycamore's claim of small entity status—and its payment of reduced fees to the United States Patent and Trademark Office ("PTO") based on its asserted entitlement to small entity status—was unjustified and constituted inequitable conduct as a matter of law. Dkt. No. 186; Dkt. No. 260.

The Federal Circuit has ruled on several occasions that, in the right circumstances, the improper invocation of small entity status by an inventor not entitled to that status can constitute

inequitable conduct sufficient to render the inventor's patent unenforceable. See Nilssen v. Osram Sylvania, Inc., 504 F.3d 1223 (Fed. Cir. 2007); Ulead Sys., Inc. v. Lex Computer & Mgmt. Corp., 351 F.3d 1139 (Fed. Cir. 2003); DH Tech., Inc. v. Synergystek Int'l, Inc., 154 F.3d 1333 (Fed. Cir. 1998). In the Nilssen case, the court noted that the district court had found clear and convincing evidence of the patent owner's "obvious intent to mislead." 504 F.3d at 1231. In both Ulead and DH Technology, the Federal Circuit reversed trial courts that had entered judgments of inequitable conduct based on the improper payment of small entity fees and held that further proceedings were required in order to determine whether the patentee had acted with intent to deceive the PTO. It is clear that in this case similar evidence would be required before the Court could find inequitable conduct based on the claim of entitlement to small entity status.

At the motions hearing, the Court ruled that the defendants have adduced sufficient evidence about the activities of Sycamore's general counsel and managing partner, Dr. Kai Zhu, from which a finder of fact could conclude that Sycamore acted with the level of intent necessary to constitute inequitable conduct under the governing standards. See Therasense, Inc. v. Becton, Dickinson & Co., 649 F.3d 1276, 1290–91 (Fed. Cir. 2011) (en banc). That evidence includes the fact that Dr. Zhu is a patent attorney who is familiar with patent prosecution, and that in light of Sycamore's financial situation, he had a significant incentive to avoid paying more than the small entity fee. While the evidence of intent to deceive is not especially strong, such evidence is often difficult to develop except from the person who is accused of deceitful intent. An issue such as this one therefore is particularly appropriate for resolution after a trial. Accordingly, the Court therefore DENIES the motion to hold, on summary judgment, that the '405 patent is not unenforceable for inequitable conduct.

E. Exhaustion

The Court will not at this time address Defendants' Motion for Summary Judgment that Sycamore's Rights in the '405 Patent Are Exhausted, Dkt. No. 178, which was filed only on behalf of AT&T and CenturyLink.

CONCLUSION

This order resolves all of Sycamore's claims against each of the defendants. However, Level 3, AT&T, and CenturyLink have each raised a number of counterclaims, including for invalidity and unenforceability, that are not fully resolved by this order. Therefore, it is ORDERED that the parties shall promptly meet and confer to determine whether the trial set for April 23, 2018, is necessary. If trial in the Level 3 case is not necessary, the Court will conduct the trial in the AT&T case (if necessary) on that date or, if not necessary, the CenturyLink case (if necessary).

By 3 p.m. Eastern Time on February 23, 2018, Sycamore and each of the remaining sets of defendants are directed to advise the Court whether trial will be necessary at this time in any of the three remaining cases. If additional motions are contemplated, the parties shall so advise the Court and propose a briefing schedule.

IT IS SO ORDERED.

SIGNED this 16th day of February, 2018.

William C. Bryson

WILLIAM C. BRYSON
UNITED STATES CIRCUIT JUDGE